Assembly and Installation Manual

TYPE:

ECOWIND 350 ECC

MODEL:

350 "C" - AUS 12/24 V

vers. 03 - MY 2010

AIR-CONDITIONING SYSTEM

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1.1. INTRODUCTION

Important warnings

To safeguard authorised installation technicians, and to prevent the possibility of damage to the equipment, make sure that you are familiar with the entire contents of the instruction manual before performing any operations on the system.

Intended readers of the assembly and installation manual

This manual is for:

- authorised technicians specialized in assembly and installation of the equipment.

Limited liability

ECOWIND by Lombardini declines all responsibility for damage caused to persons or things resulting from incorrect installation of the system.

Storage of the manual

This manual must be intact and fully legible in all parts. Authorised specialist technicians must have access to it during their work.

Storage of the manual

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1.2. Recommended oil

PAKELO KRIPTON 10 W 60 - specification API CH-4/CF SL, ACEA E4,E5,E7,B4.

NOTE! Alternatively, we reccomend using the following oil: *MOBIL 1 15W50* specification API CF ACEA E4, B4, B3.

The engine could be damaged if allowed to operate with insufficient oil. It is also dangerous to add too much oil as its combustion could sharply increase the rotation speed.
Use a suitable oil in order to protect the engine.
The lubrication oil influences the performances and life of the engine in an incredible way.
The risk of piston seizure, jammed piston rings and rapid wear of the cylinder liner, the bearings and all moving parts increases if oil whose characteristics differ from the recommended type is used, or if the oil is not regularly changed. All this notably reduces engine life.
Oil viscosity must suit the ambient temperature in which the engine operates.

Old oil can cause skin cancer if repeatedly left in contact with the skin and for long periods of time. If contact with the oil is inevitable, you are advised to thoroughly wash your hands with soap and water as soon as possible.
Appropriate protective gloves etc should be wore during this operation.
Old oil is highly polluting and must be disposed of in the correct way. Do not litter.

LUBRICANT INTERNATIONAL SPECIFICATIONS

They define testing performances and procedures that the lubricants need to successfully respond to in several engine testing and laboratory analysis so as to be considered qualified and in conformity to the regulations set for each lubrication kind.

A.P.I : (American Petroleum Institute)
MIL : Engine oil U.S. military specifications released for logistic reasons
ACEA : European Automobile Manufacturers Association

ACEA REGULATIONS - ACEA SEQUENCES

PETROL

A1 = Low-viscosity, for frictions reduction

A2 = Standard

A3 = High performances

LIGHT DUTY DIESEL ENGINES

B1 = Low-viscosity, for frictions reduction engines)

B2 = Standard

B3 = High performances (indirect injection)

B4 = High quality (direct injection)

HEAVY DUTY DIESEL ENGINES

E1 = OBSOLETE

E2 = Standard

E3 = Heavy conditions (Euro 1 - Euro 2 engines)

E4 = Heavy conditions (Euro 1 - Euro 2 - Euro 3 engines)

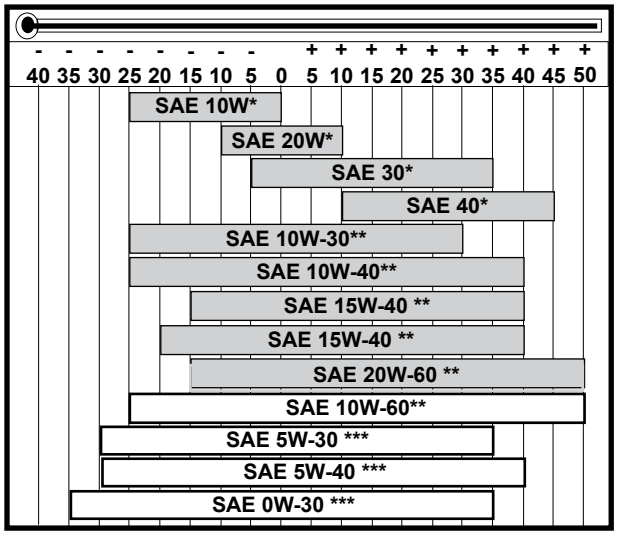
E5 = High performances in heavy conditions (Euro 1 - Euro 2 - Euro 3

SEQUENZE API / MIL - SEQUENCES API / MIL - API / MIL SEQUENCES

API / MIL-SEQUENZEN - SECUENCIAS API / MIL - SEQUÊNCIAS API / MIL

	DIESEL								BENZINA - ESSENCE - PETROL BENZIN - GASOLINA							
API	CH-4	CG-4	CF-4	CF-2	CF	CE	CD	CC	SC	SD	SE	SF	SG	SH	SJ	SL
MIL			L- 46152 D / E													

CORRENTI - CURRENT | OBSOLETI - OBSOLETE



Gradazioni SAE - Viscosité SAE - SAE Grade
SAE Viskositätsklasse - Viscosidad SAE - Gradação SAE

SAE 15W-40 *	SAE 15W-40 ** SAE 20W-60 **	SAE 10W-60 SAE 5W-30 *** SAE 0W-30 ***
base minerale base minérale mineral base Mineralölbasis Base mineral base mineral	base semi-sintetica base semi-synthétique semi-synthetic base Halbsynthetische Basis Base semi-sintetica base semi-sintética	base sintetica base synthétique synthetic base Synthetische Basis base sintetica base sintética

ATTENTION !!!

All power unit engines are oil pre-charged.
Guarantee that maintenance has been effected is confirmed by an adhesive with oil specifications put on engine valves cover.

ECO WIND
BY LOMBARDINI
Motore fornito dalla LOMBARDINI con olio
pakelo KRYPTON SAE 10W/60 al livello prescritto.
Per successivi rifornimenti verificare il libretto di uso e manutenzione.
Rimuovere questa targhetta dopo il primo avviamento.
Engine supplied by LOMBARDINI with
pakelo KRYPTON SAE 10W/60 oil at the prescribed level.
For oil change or releveling check on the use maintenance booklet.
Remove this label after first engine start.
pakelo lubricants
3335.539

Fig. 1

ATTENTION !!!

The oil quantity for a correct charging is : Qts 1,25 Liters

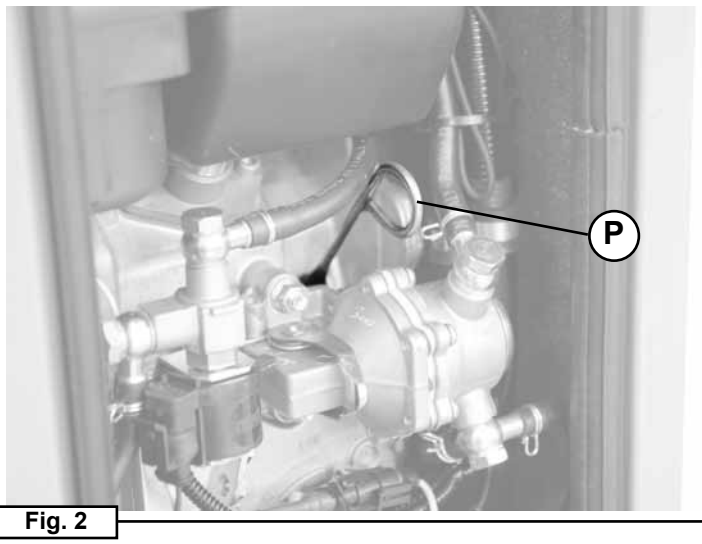
This quantity has to be strictly respected

ATTENTION !!!

We suggest, after any operation, to refill or replace oil and to alwasy check oil level through proper oil dipstick **C**.

ATTENTION !!!

Correct oil quantity is when level is near notch MAX, paying particular attention do not overpass it (fig. 2).



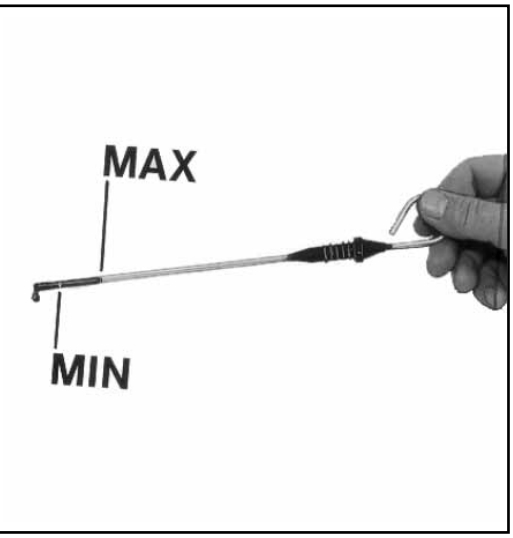


Fig. 2

1.3. CE IDENTIFICATION PLATE

The ECOWIND air-conditioning system is manufactured in a European Union state, and therefore complies with the safety requisites of Machinery Directive 98/37/EC, in force since 23 July 1998.
This conformity is certified by the “CE” mark located on the body of the power unit, inside the front protective casing.

NOTE!
Do not damage or remove the CE identification plate, even when the system is resold (fig. 3).

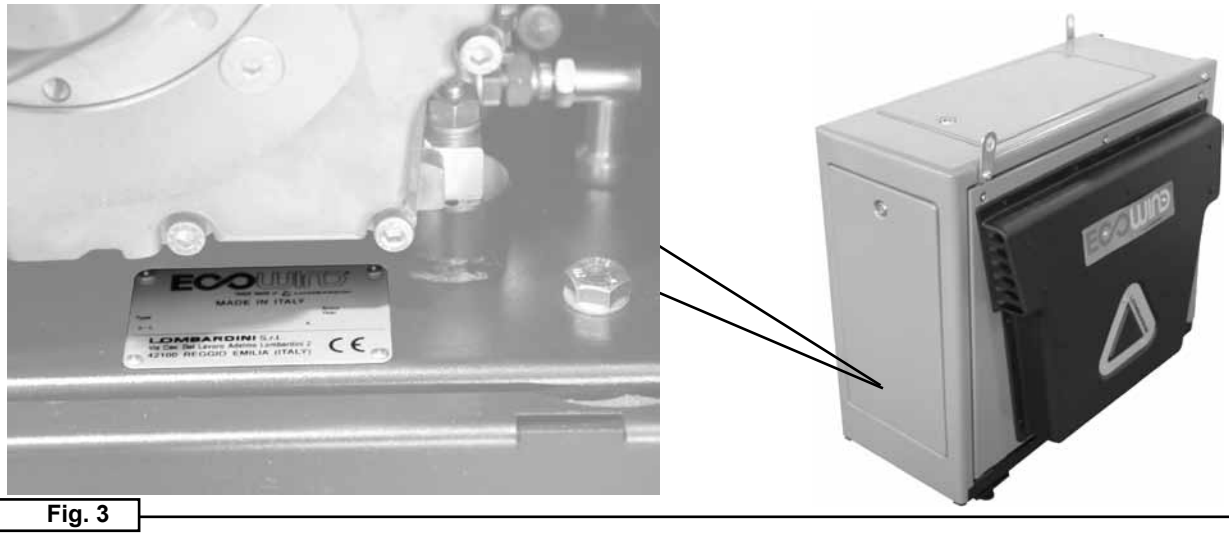


Fig. 3

1.4. DIRECTIVE AND STANDARD REFERENCES APPLIED

Legal provisions

Reference	Title
P. D. no. 459 of 24.7.96	Implementation of EEC Directive no. 89/392 known as the Machinery Directive
L. D. no. 476 of 4.12.92	Implementation of EEC Directive no. 89/336 regarding Electromagnetic Compatibility (EMC)

Table 1-1

EU Directives

Reference	Title
EU Directive no. 98/37	Machinery Directive 89/392/EEC codified 98/37
EU Directive no. 89/336	Electromagnetic Compatibility (EMC)
Directive 2000/2/EC	Directive regarding electromagnetic compatibility (EMC) for agricultural and forestry tractors.
Directive 2004/104/EC	Directive regarding electromagnetic compatibility (EMC) for motor vehicles and their trailers.
Directive 95/54/EC	Directive regarding electromagnetic compatibility (EMC) for motor vehicles.
ECE R10	ECE/UN regulation regarding electromagnetic compatibility for motor vehicles.

Table 1-2

2.1 TECHNICAL CHARACTERISTICS

Table of technical data

Air-conditioning system			
Model	**350 “C” - AUS**		
Dimensions and weight	**Power unit**	**Condenser**	**Split (diffuser)**
Length	710 mm	560 mm	560 mm
Height	560 mm	360 mm	360 mm
Depth	290 mm	120 mm	140 mm
Weight	110 kg *	6 kg	10 kg
*** Without support structure**			

350 “C” AUS	
Fuel	Diesel for automotive use (taken from the vehicle’s own tank for models installed directly in vehicles)
Maximum fuel consumption	0,7 litre/ h
Cooling capacity	13.000 btu/h (3.800 W)
Coolant	R-134a
Quantity of coolant	min 1000 ÷ max 1200 gr. * The amount of gas may vary according to pipe length see Tab. 1 and Tab. 2

Optimum operating pressure: Delivery pressure HP = 14 ÷ 17 bar - @ 30° C ext. temp.
Intake pressure LP = 1 ÷ 3 bar - @ 30° C ext. temp.

ATTENTION !!!

It is important to comply with the above quantities.
Non-observance of this recommendation could compromise the performance of the system

Onboard electrical power supply	12 V	24 V
Battery recharge capacity (alternator)	70 A - MAX	40 A - MAX
Evaporator airflow	600 m^3/h - MAX	600 m^3/h - MAX
Control system power supply	12 Vdc	24 Vdc

TAB 1

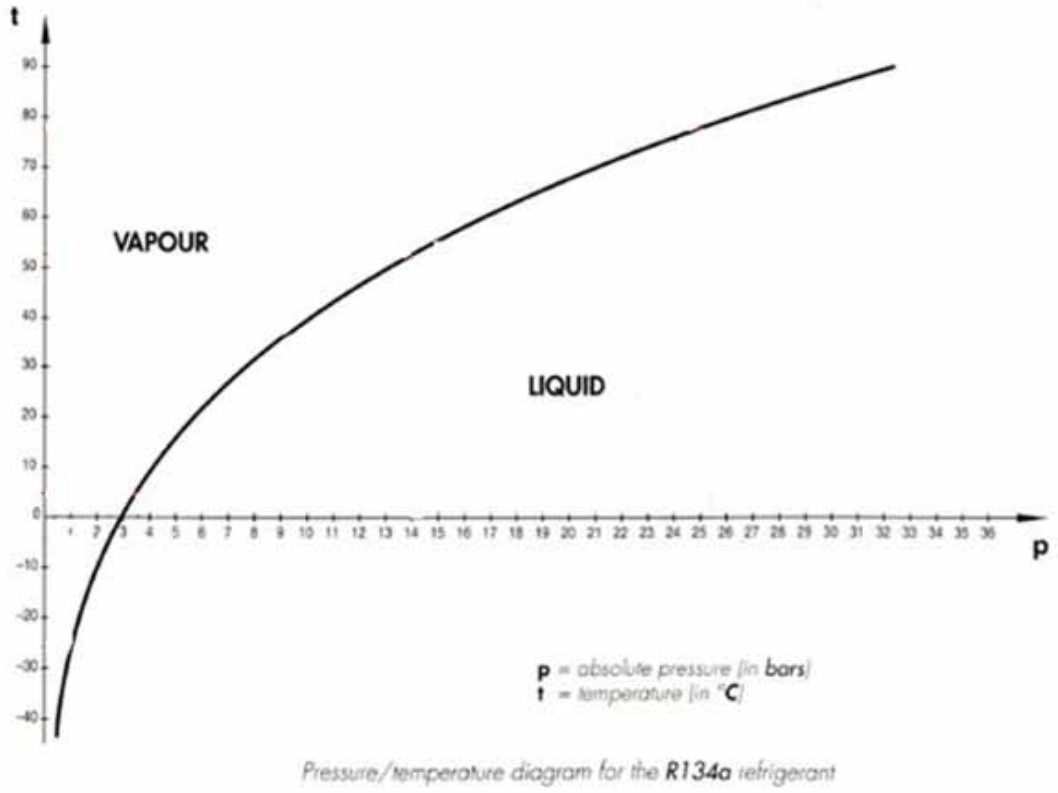
TEST	Qty R134a	HOSE	LENGHT	TEMPERATURE EXT.	SUC LOW PRESS.	DISC HIGH PRESS.
N°	gr	SIZE	mt	°C	bar	bar
#1	**1200**			30,5	2	16
		G 10	10			
		G 08	10			
		G 06	3			
N°	gr	SIZE	mt	°C	bar	bar
#2	**1100**			30,4	2	16
		G 10	5			
		G 08	5			
		G 06	3			
N°	gr	SIZE	mt	°C	bar	bar
#3	**1000**			30,7	2	16
		G 10	1,5			
		G 08	1,5			
		G 06	1,5			

TAB 2

REFERENCE PRESSURE TABLE		
Outside Temperature [°C]	Fixed displacement compressor (F) (es. SD5H09, SD7H15)	
	R134a	
	LP [kg/cm²]	HP [kg/cm²]
	min max	min max
15,5	0,5.....3,0	9,5.....13,0
21,0	0,5.....3,0	12,5.....17,5
26,5	0,5.....3,0	14,0.....20,5
32,0	0,5.....3,5	16,0.....24,0
38,8	0,5.....3,5	18,5.....25,5
43,0	0,5.....3,5	22,0.....28,0

A/C pressures according to ambient temperature for R134a

TAB 3



Pressure/temperature diagram for the **R134a** refrigerant

TAB 4

OIL FOR R-134 A PHYSICAL PROPERTY

LUBRICANT		SP20
SPECIAL GRAVITY	15° C	1.044
COLOUR (ASTM)		L 0.5
KINEMATIC VISCOSITY (cst)	40°C 100°C	104.5 21.15
VISCOSITY INDEX		235
FLASH POINT	(°C)	230
POUR POINT	(°C)	<-50
FALEX LOAD TEST (LBS/IN²)		1350
CRITICAL SOLUBILITY POINT (°C)	UPPER LOWER	+52 (3%) <-40
TYPE		PAG

TAB 5

AGIP BETULA ESX 100

Viscosity at 40°C	mm^2/s	105,9
Viscosity at 100°C	mm^2/s	12,1
Viscosity Index	--	105
Flash Point COC	°C	284
Pour Point	°C	- 42
Flock Point (oil/R134a 1/9)	°C	- 40
Mass density at 15°C	kg/l	0,982

The AGIP BETULA ESX are synthetic lubricants formulated with selected polyolesters with superior characteristics which make them suitable for lubrication of compressors where HFC refrigerants are used (supplied in Kit)

2.2 CHARACTERISTICS OF COOLANT

Recommended products: Fluorocarbon coolant R-134a - (TETRAFLUORETHANE).

Non-recommended Products: Compressor oil: PAG SP 20 or equivalent (see chart oil) Tab 5

ATTENTION !!!

– All coolants not mentioned in the "recommended products" section are not to be considered for use, are inappropriate and hence prohibited.
Lombardini S.r.l declines all responsibility for damage to persons or things caused by non-observance of this regulation.

Safety warnings: It is important to observe the following safety regulations when carrying out maintenance on the system:

ATTENTION !!!

fluorocarbon coolants evaporate rapidly, freezing anything with which they come into contact, if accidentally released in liquid form into the atmosphere. Furthermore, in the presence of flames or electrical short circuits, they may produce toxic gases capable of causing serious irritation to the respiratory tract.

Moreover, this kind of coolant tends to displace air, causing a reduction in the level of oxygen and the risk of suffocation. Always take precautions when working with coolants or on air-conditioning systems that contain coolants, particularly in closed or confined spaces.

ATTENTION !!!

First aid treatment in the event of contact with the coolant.

Contact with EYES:

• if there is contact with the liquid, rinse thoroughly with water and seek immediate medical attention.

Contact with SKIN:

• rinse the area with plenty of lukewarm water and stay calm;
• wrap the burns in thick, dry, sterile bandages to protect the area from further infections or wounding;
• seek medical attention.

INHALATION:

• immediately remove the patient to the open air and, if necessary, help him/her to breathe again;
• seek medical attention and remain with the patient until the arrival of professional help.

2.3 Summary diagram of the ECOWIND air-conditioning system for model :

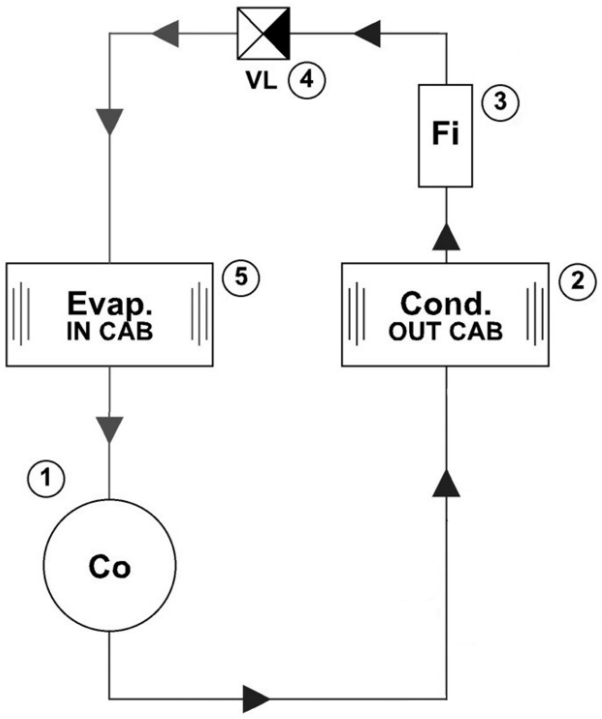
350 “C”

CONVENTIONAL COOLING CYCLE

The diagram in Tab 6 shows the flow chart of the conditioning process:

HP) High pressure - Compression (min 10 ÷ max 27 - bars _coolant R 134 a);
LP) Low pressure - Intake (min 1 ÷ max 5 – bars_coolant R 134 a);

N.B.: Optimal values for a correct functioning of the system ; are 1.5÷2 suc 13÷17 disc (bar) - @ ext Temp - Tp 30° C



Tab. 6

LEGEND:

1 COMPRESSOR AC;
2 AC CONDENSER;
3 DEWATERING FILTER;
4 EXPANSION VALVE;
5 EVAPORATOR AC;

GAS R134a LOW PRESSURE (LP)

GAS R134a HIGH PRESSURE (HP)

3.1 REQUIREMENTS AND REGULATIONS FOR ASSEMBLY AND INSTALLATION

Preliminary requirements

Listed below are the fundamental requisites that must be observed by persons installing and assembling the ECOWIND air-conditioning system.

Before proceeding with the operations it is necessary to:

• make sure there exists no critical interference in any of the operating conditions. In particular, make sure that the safety conditions of all moving components are stable;
• make sure that parts do not rub together, with the risk of wear, by tightening and positioning correctly;
• make sure that there is proper electrical insulation and that fuses and all components on the electrical system are installed correctly;
• after loading the coolant, perform a careful inspection for gas leaks and check system pressure;
• all operations should be carried following standards of good technical practice;
• protect all fissures or perforations made during installation with anti-rust product.

Characteristics of lifting equipment

The power unit should be lifted with equipment that is:

• suitable for the dimensions of the unit;
• in good working condition.

ATTENTION !!!

Lifting equipment must have a lifting capacity 20% above the weight of the object that is lifted.

Rules for authorised installers

Authorised technicians must observe the following regulations:

• do not linger or pass under the units that are handled during lifting or transport;
• do not move or rotate lifted units by their cables or pipes;
• use appropriate and safe equipment when working above the vehicle. Do not climb parts of the system or the vehicle.

ATTENTION !!!

Owing to the numerous types of equipment developed for vehicles available on the market, (oversized fuel tanks, custom-built glove compartments etc...) and to the increasingly smaller anchor spaces, the assembly solutions provided in this manual are principally intended for "STANDARD FACTORY" vehicles.
It is therefore clear that the assembly solutions to be used for an already customised vehicle (by the customer and/or dealer) must be evaluated by the installer and agreed in advance with the final customer.

3.2 LIFTING, HANDLING AND INSTALLATION OF THE COMPONENTS

Procedure for installation and assembly

INSTALLATION OF THE SUPPORT STRUCTURE OF THE POWER UNIT

Step	Description
1	Make sure the vehicle is on a level surface and is at a complete rest.

3.3 POWER UNIT ASSEMBLY KIT

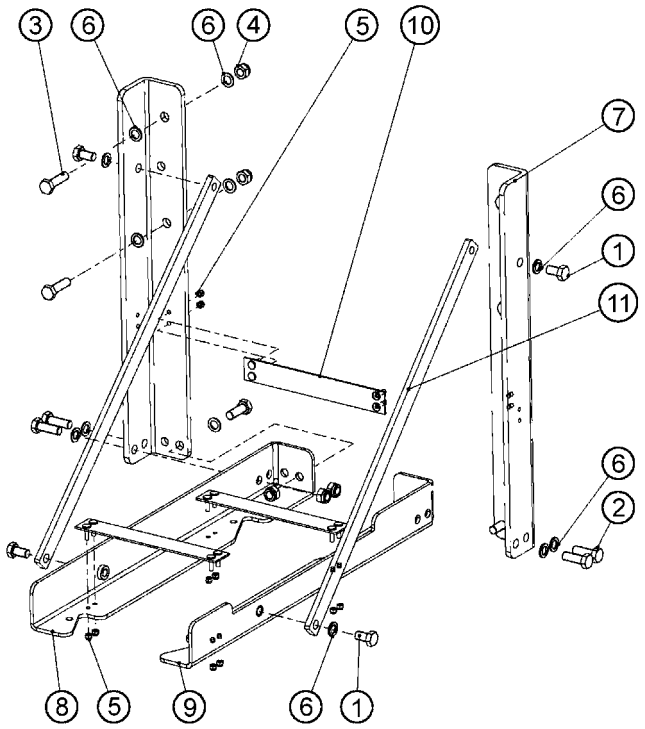


Fig. 4

Legend:

1. Screw TE UNI 5740.65 M14x25 ..... n° 4
2. Screw TE UNI 5740.65 M14x40 ..... n° 6
3. Screw TE UNI 5740.65 M14x50 ..... n° 4
4. Nut self lock M14 ..... n° 10
5. Nut self lock M6 ..... n° 12
6. Washer Ø 15x25x2,5 ..... n° 18
7. Nut self lock M10 ..... n° 4
8. Wascher Ø 10 ..... n° 4

Screws to fix the frame

ATTENTION ! ! !

Assemble the entire support structure on the workbench before attaching it to the frame.

WARNING

The holes, F1 and F2 indicate on brackets "7" are not drilled, because their to be drilled during the installation and also must be considered the kind of vehicle frame .
The minimum height H recommended of power unit frame S to the floor, must be at measurement as showed in fig. 6 pag. 18.

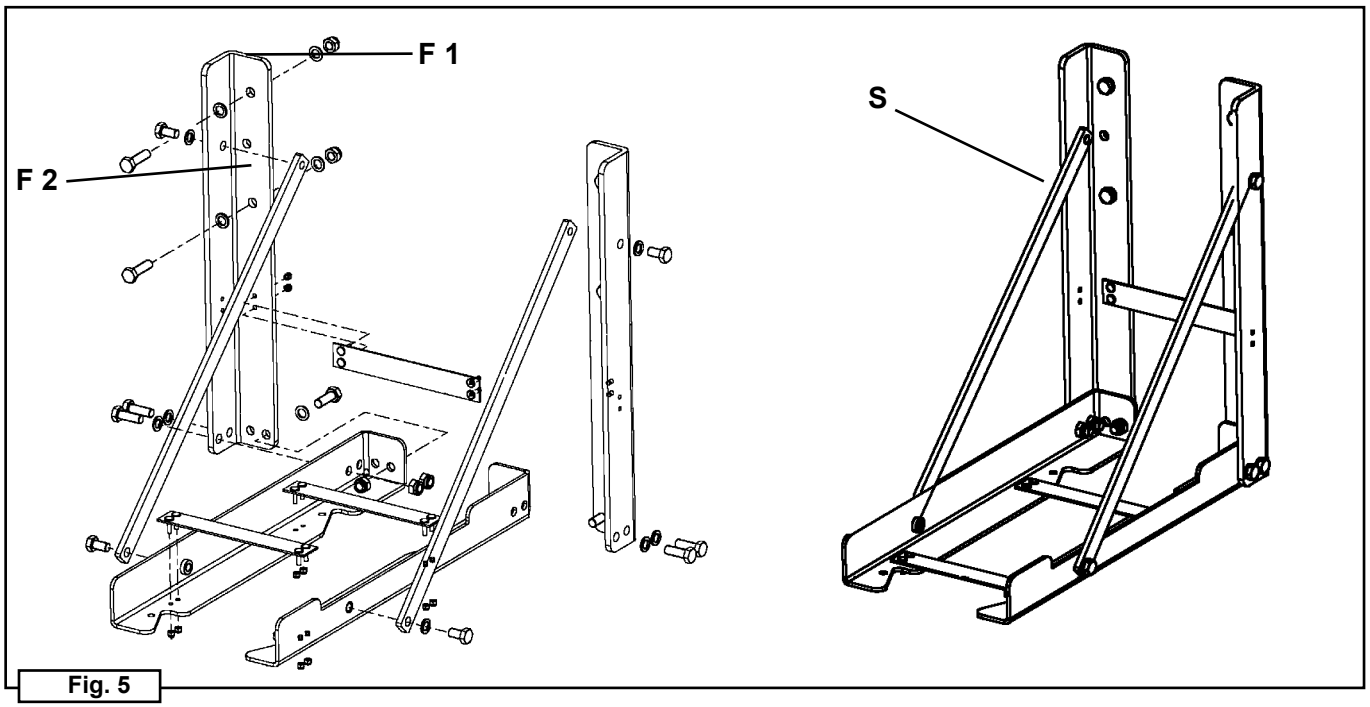


Fig. 5

Tab. 7

MAXIMUM VALUES OF THE DRIVING TOURQUES FOR SCREWS (in N.m.)

Thread	Screw steel class			Wrench opening (mm)
	5.8	8.8	10.9	
M 4(x0.7)	1.8	2.9	4.2	7
M 5(x0.8)	3.4	5.5	7.5	8
M 6(x1)	6.00	10	13	10
M 7(x1)	11	16	21	11
M8(x1.25)	14	22	30	13
M 8x1	15	23	32	13
M10(x1.5)	27	45	61	17
M10 x1,25	31	50	67	17
M10 x1	33	53	71	17
M12 x1.5	51	78	105	19
M12 x1.25	60	94	125	19
M12 x1.75	84.8	119	143	19
M14 x1.5	80	120	165	22
M16 x1.5	120	185	255	24
M18 x1.5	165	265	350	27
M20 x1.5	225	360	490	30
M22 x1.5	295	480	640	32
M24 x2	390	610	805	36

3.4 MOUNTING DIRECTLY TO THE SIDE FRAME

STEP 1

After mounting on bench the power unit frame **S** , attach the vertical bracket **V** at the vehicle frame **F** as reported on fig. 6.

WARNING

We advice to install the frame power unit S with a deep H not less at 300 mm for more safety against the conformation of kind of floor.

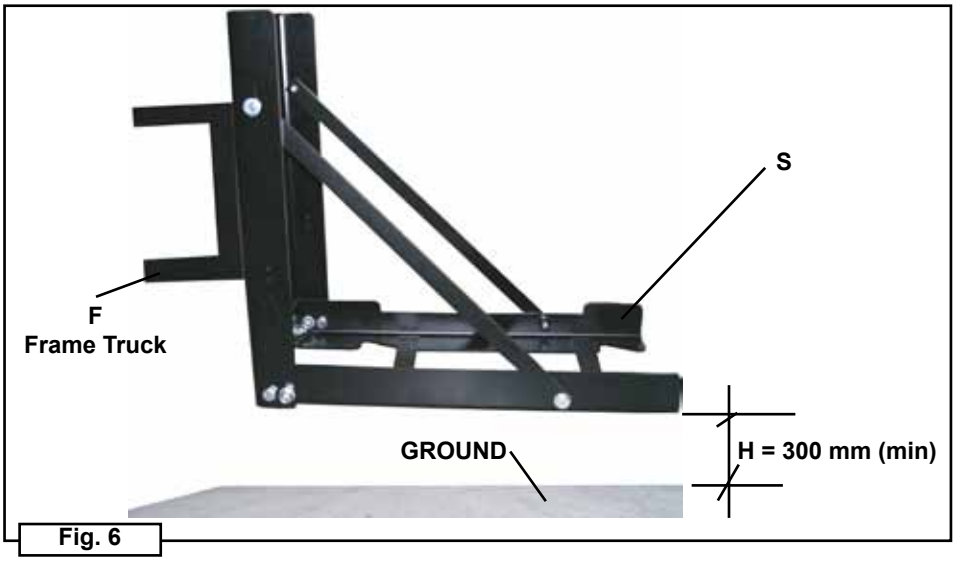


Fig. 6

STEP 2

After the operation to position the frames **S** regarding **F**, to drill four holes of 15 mm diameter as showed in fig. 7

WARNING

For a correct installation of frame S, we recommended to drill at measurements as indicate in fig. 7.

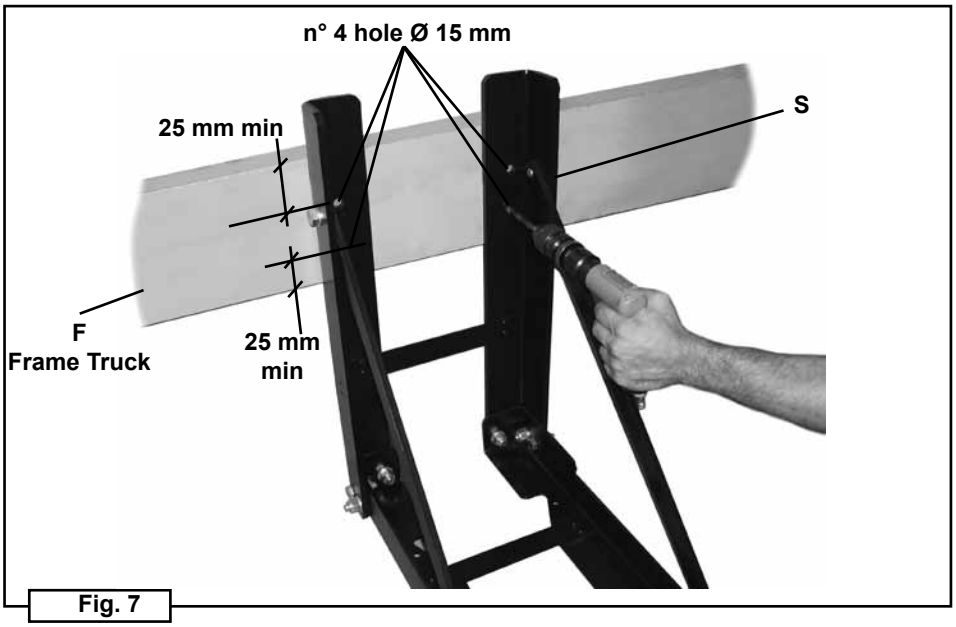


Fig. 7

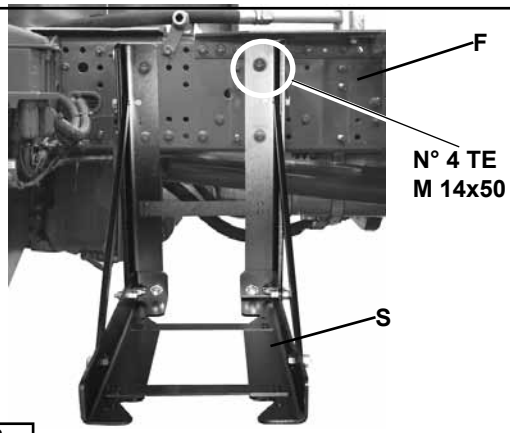


Fig. 8

Step	Description
3	Fix the frame power unit **S** to the frame vehicle **F** see fig. 8, using the bolts supplied as reported on the exploded fig. 4 pag.16 positions 1÷8, and torque with values on tab. pag. 17

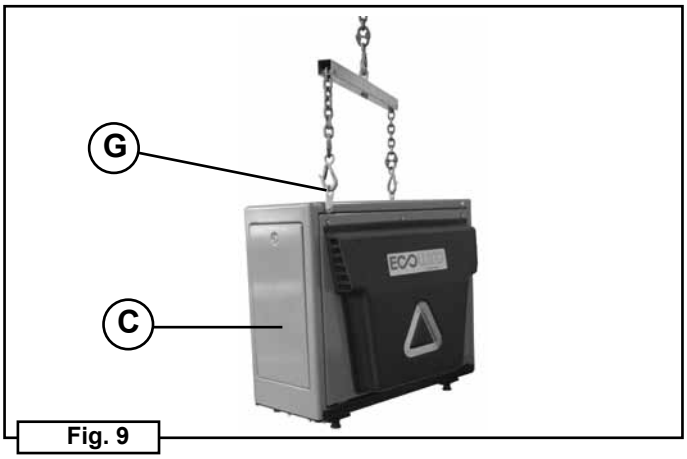


Fig. 9

Step	Description
4	Lift the Power Unit using the eyebolts **G** on the protective casing **C** (fig. 9).

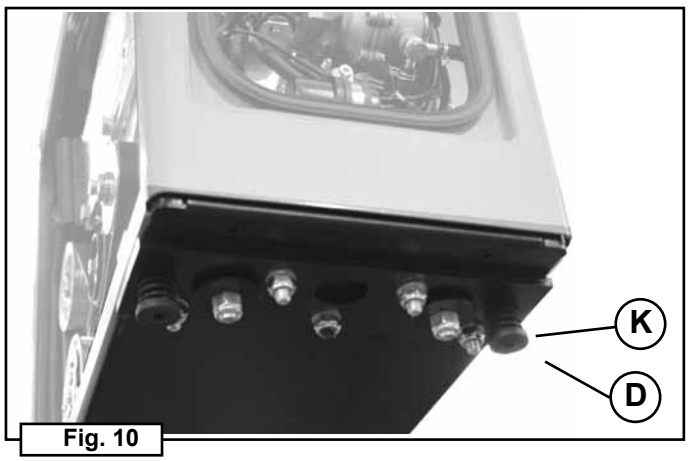


Fig. 10

Step	Description
5	Unscrew and discard the four plastic protection **D** located under the Power Unit support on the stud M10 **K** (fig. 10).

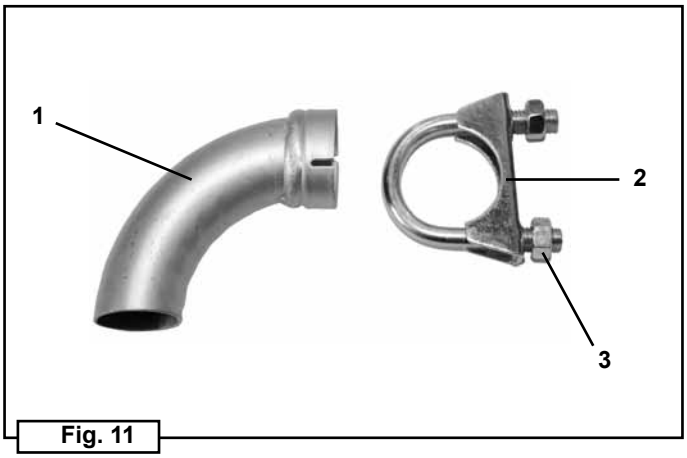


Fig. 11

Power Unit Muffler Bend (fig. 11)

1. Muffler bend
2. Coupling box
3. Coupling box nuts

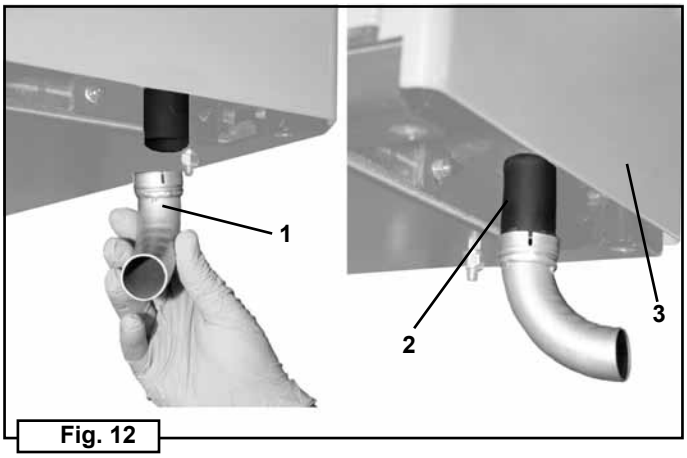


Fig. 12

Step	Description
6	Attach the supplied muffler bend to the power unit muffler. See Figure 12.

Insert Muffler Bend

1. Muffler bend
2. Muffler
3. Power Unit

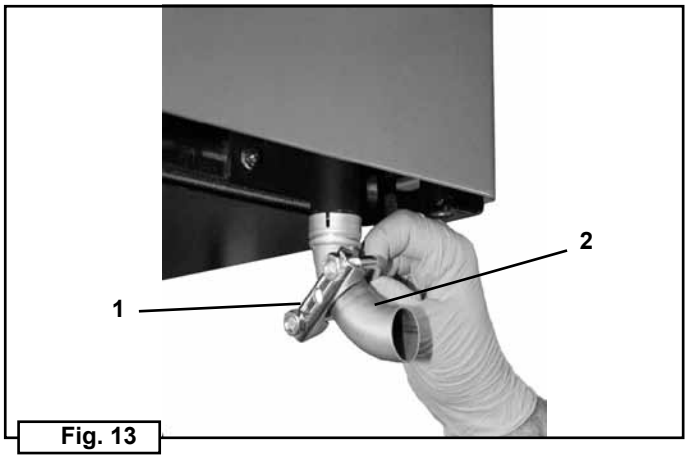


Fig. 13

Step	Description
7	Insert the supplied coupling box on the muffler bend. See Figure 13.

Mount Coupling Box

1. Coupling box
2. Muffler bend

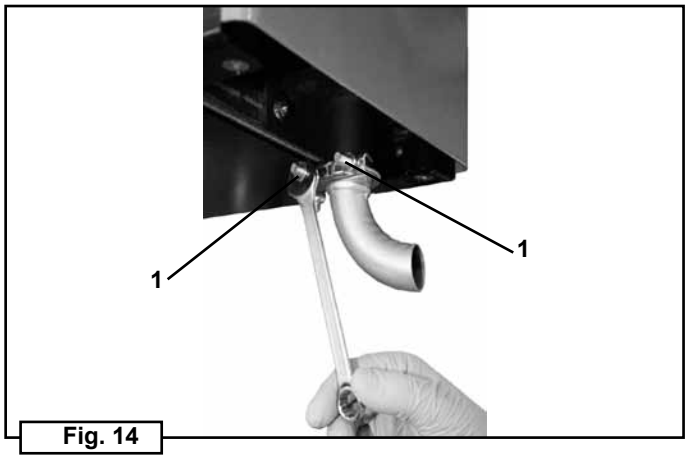


Fig. 14

Step	Description
8	Position the coupling box as shown in the picture and tighten the two nuts with the appropriate tool. See Figure 14.

Tighten Coupling Box Nuts

1. Coupling box nuts, qty. 2

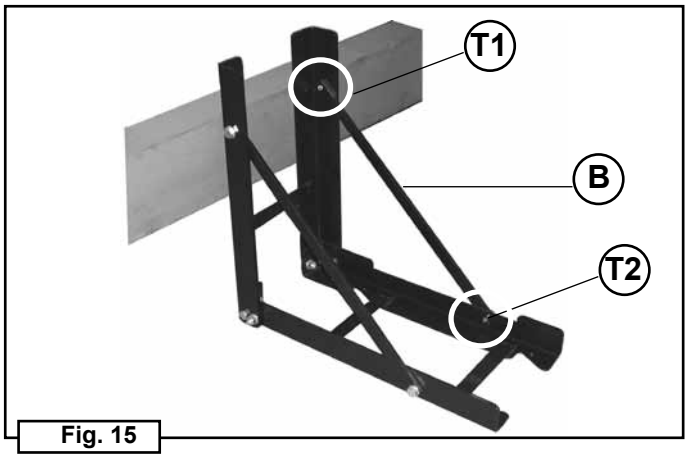


Fig. 15

Step	Description
9	Temporarily disassembly the side bracket **B** (Dx) as showed in fig. 15, and keep the bolts **T1** and **T2**.

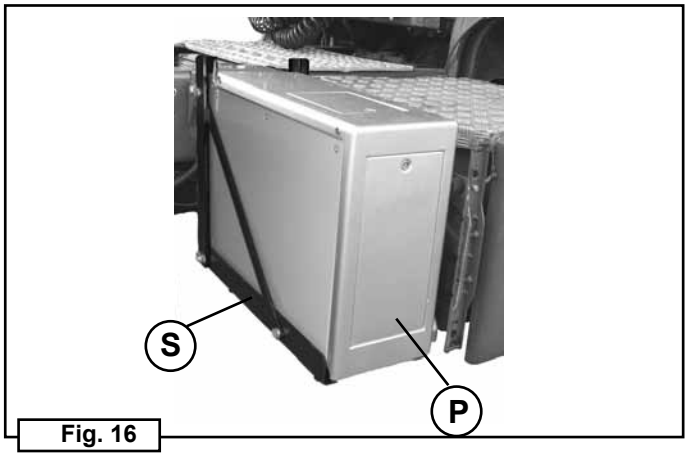


Fig. 16

Step	Description
10	Insert the power unit **P** into the support frame **S** as indicate in fig. 16

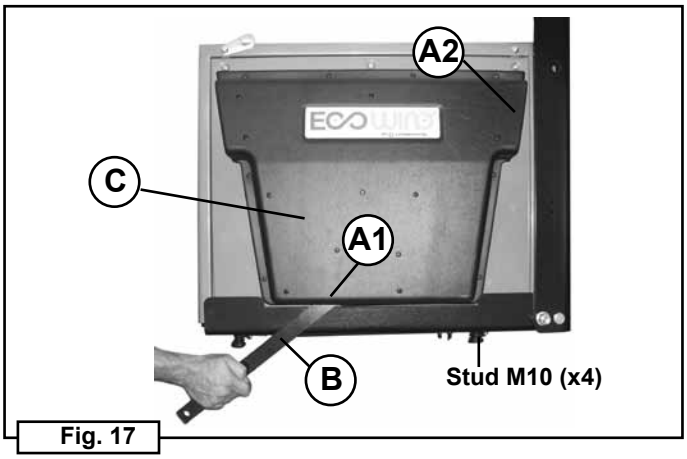


Fig. 17

Step	Description
11	Insert the side bracket **B** before disassembled into the plastic air intake **C** thought the two eyes **A1** and **A2** as showed in fig. 17

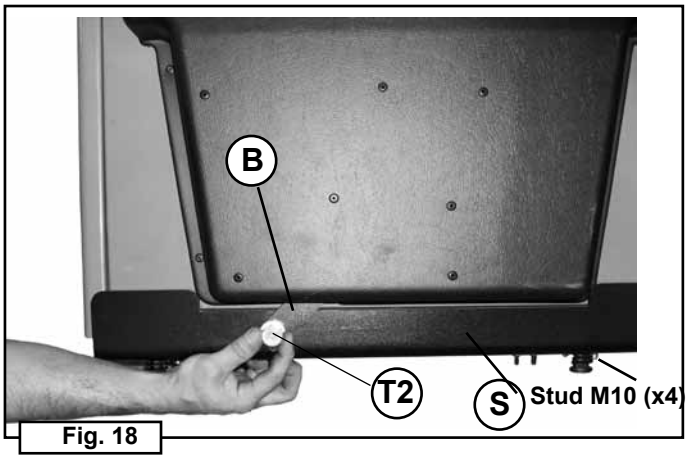


Fig. 18

Step	Description
12	Fix again the side bracket **B** at frame **S** with the bolts **T1** and **T2** previously stored as showed in fig. 18 – 19.

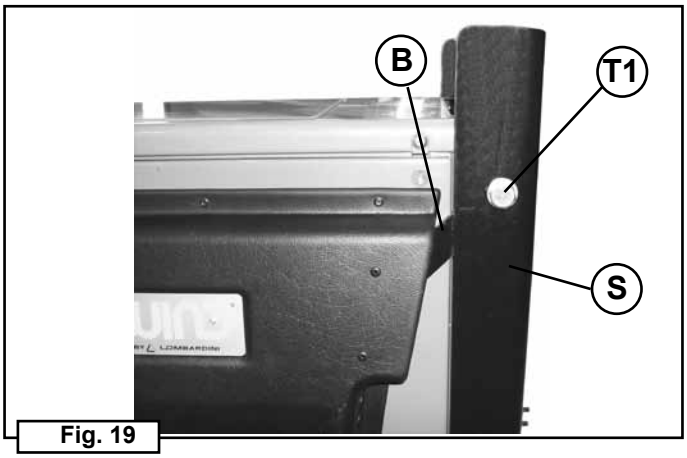


Fig. 19

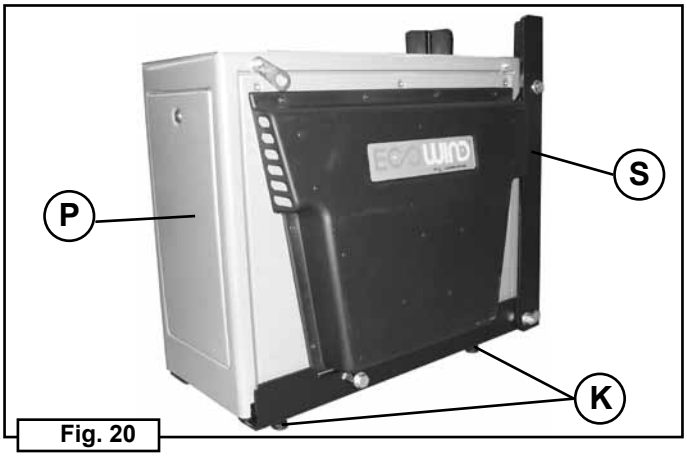


Fig. 20

Step	Description
13	Fix strongly the power unit **P** at the support frame **S** half bolts M 10 supplied end the four threaded stud **K**. See fig.20, with torque reported on tab. 7 pag. 17.

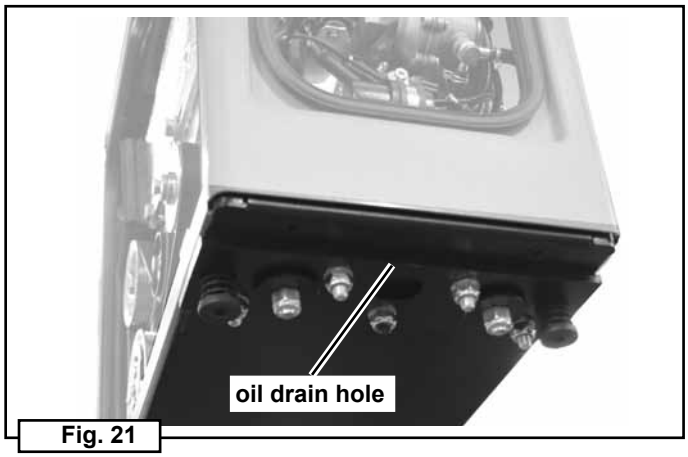


Fig. 21

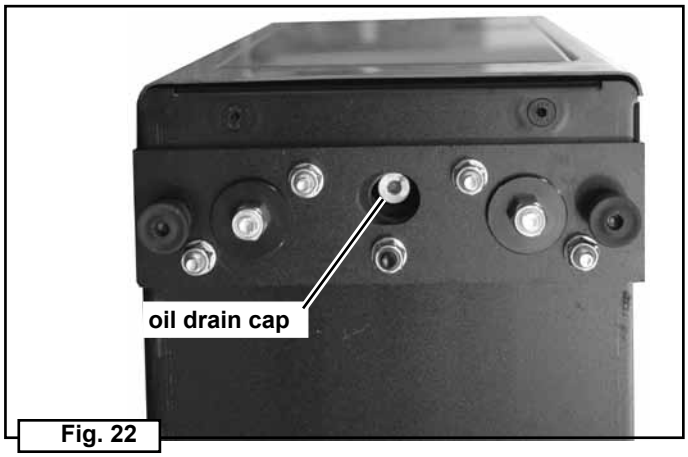


Fig. 22

Fig. 23

. Note weel

In the pictures (fig. 21 and fig. 22) is reported the position to oil drain for maintenance engine

Attention !!!

When the Power Unit has been fixed, it is advisable to firmly tighten the eyebolts on the protective casing see fig. 23).
If choosing to remove them from the protective casing, make sure to tighten the four TBEI M8x20 to support the eyebolts by following the same procedure, in order to avoid a possible noise increase from the diesel engine of the Power Unit.

3.5 INSTALLATION OF THE CONDENSING UNIT

1	Disassembly to condenser unit **C** fig. 24-25 the air plastic cover **B** complete with fan condenser **F** , unscrew and keep the bolts N° 4 TCEI M6x16, washer (**V**+**R**) see fig. 24

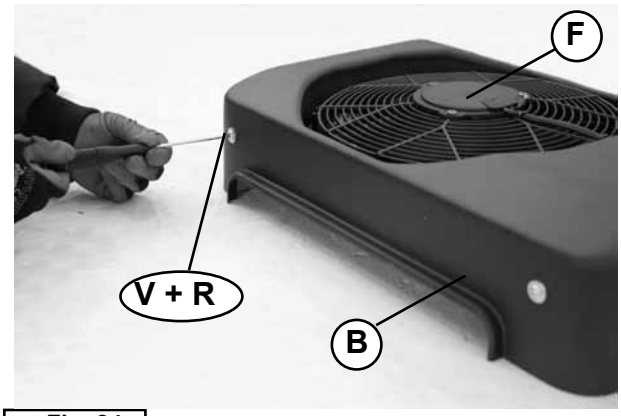


Fig. 24

Fig. 25

2	Place the condenser **C** on the back of cab and in same time to keep it in horizontal position for a correct mounting. To mark the four point **L** on the condenser bracket needful to fix the four threaded insert **T** (supplied) fig. 27 like measurements reported in fig. 26
3	Use a drill to 9 mm, and to drill the four points marked for fix the four threaded insert **T**, fix the insert threaded **T** (supplied) on the metal cab using the specific tool **M** (not supplied) see fig.27

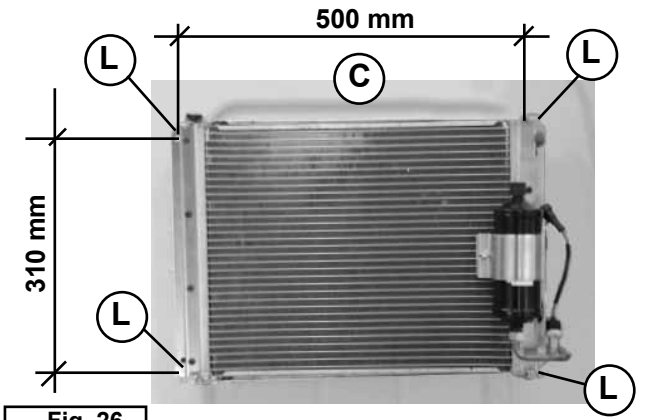


Fig. 26

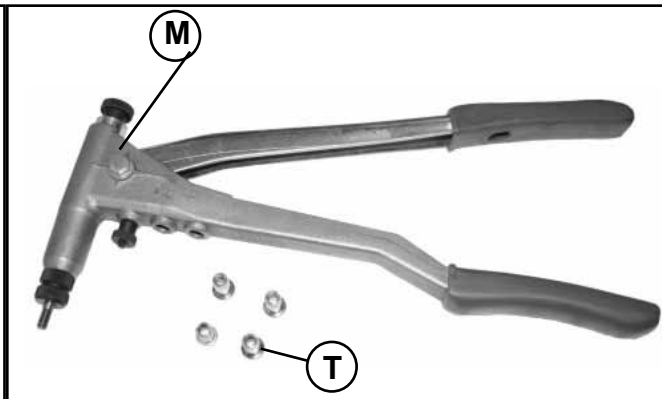


Fig. 27

4	Install and fix the condenser **C** on the back of the cab using the bolts (supplied) **F,** TE M6x35 and washer Ø 6x18, before the fixing interpose the four spacers **D** 30 – H 15 (supplied) as showed in fig.29-30

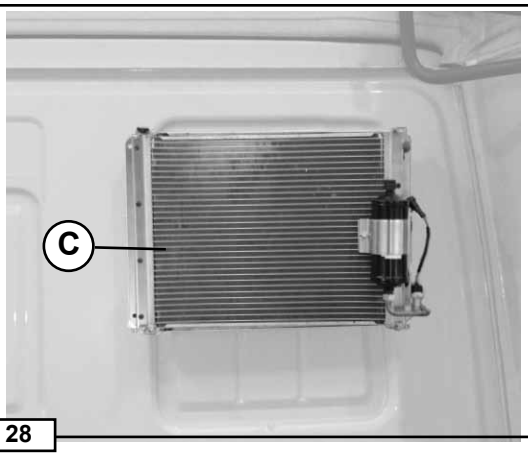


Fig. 28

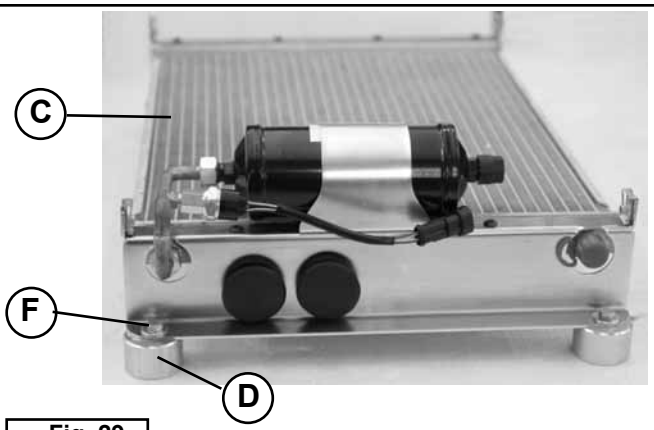


Fig. 29

Fig. 30

WARNING

If you choose for fixing to condensing unit, in other position on truck (than the recommended on rear cab as before specified), need that the new position is ensured optimum fastening and at the same time in an area where the air cooling condenser is free to flow in the field open to avoid damaging hot air recirculation function compromising optimal works system!

GAS PIPES FIXING TO BACK OF THE CAB.

1st OPTION

1	Disassembly and scrap from the condenser **C** the two rubbers **T** and then mounting the new two rubbers (protection pipe) **G** supplied as showed in fig.31-32

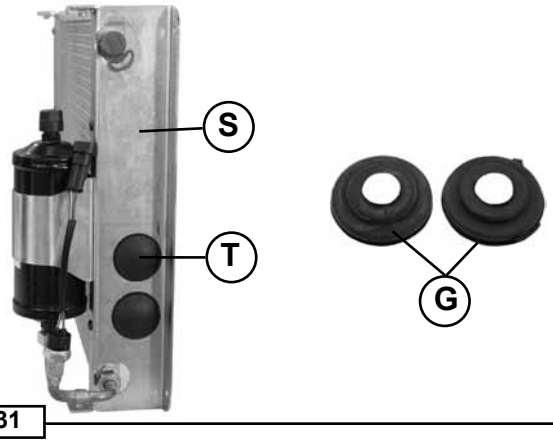


Fig. 31

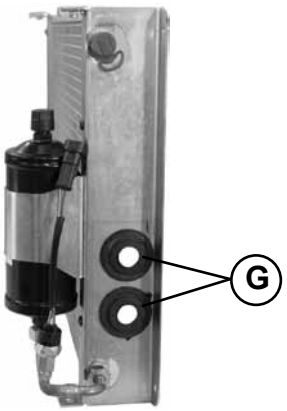


Fig. 32

2	Unscrew and scrap the plastic cap **TP** drier protection **F**, and then inlet the 100 ml of oil compressor **O** supplied. see fig. 33-34

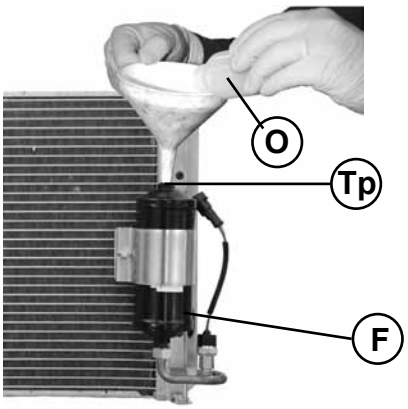


Fig. 33

Fig. 34

3	Insert the gas pipes **G6** – **G8** and cable wiring **CE** through the rubbers as showed in fig.35-36 Lock the fittings **R1** and **R2** to the condenser **C** with torque value like reported on tab. 8 pag.36

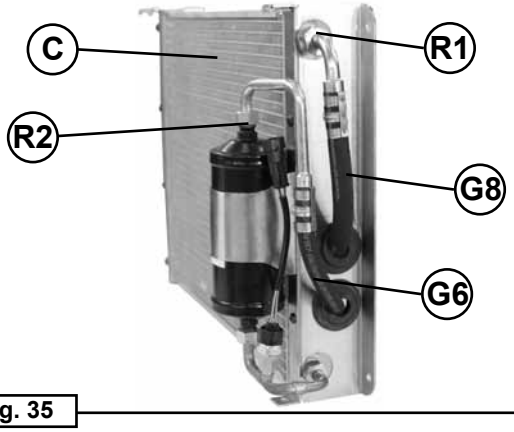


Fig. 35

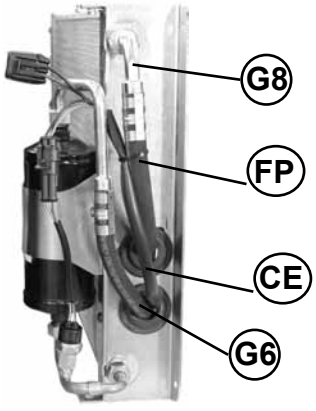


Fig. 36

4	Bended the wiring cable **CE** to gas pipe , half plastic band **FP** supplied, as showed in fig. 36
5	Reassemble the plastic cover condenser **CC** complete the wiring connection half to connector **PK** (fan) and **SS** (pressure switch) see fig. 37. Ensure the plastic cover condenser **CC** to condenser **C** half bolts preserved **V + R**.

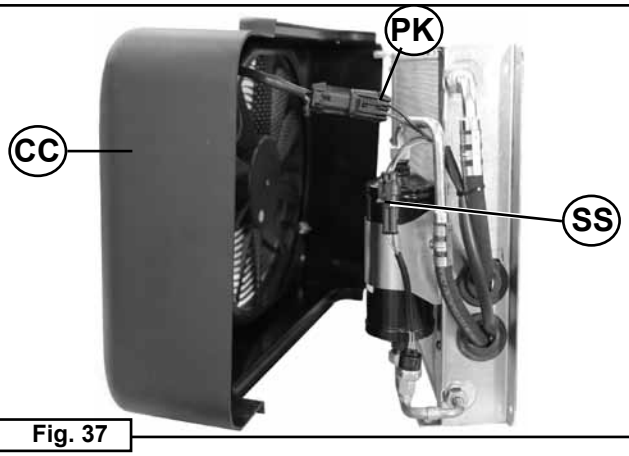


Fig. 37

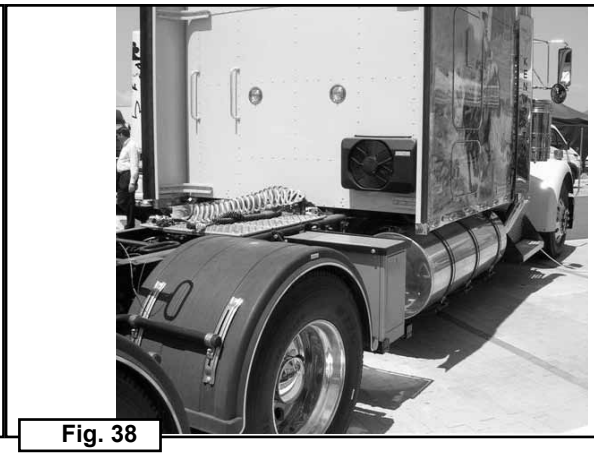


Fig. 38

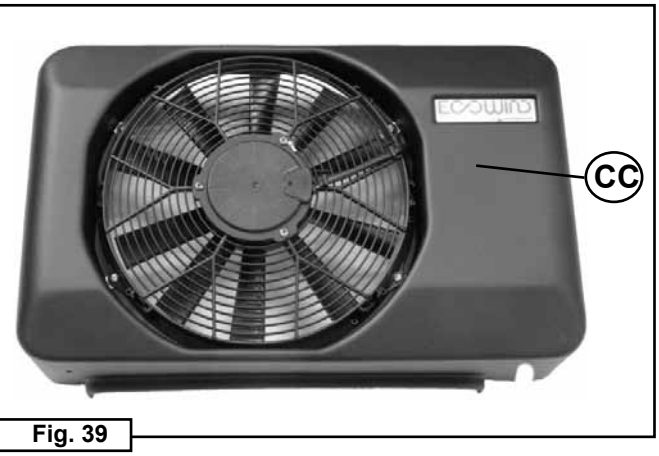


Fig. 39

6	Complete gas condenser installed (rear cab) with gas pipes on back see fig. 38

GAS PIPES FIXING TO SIDE OF THE CAB.

2nd OPTION

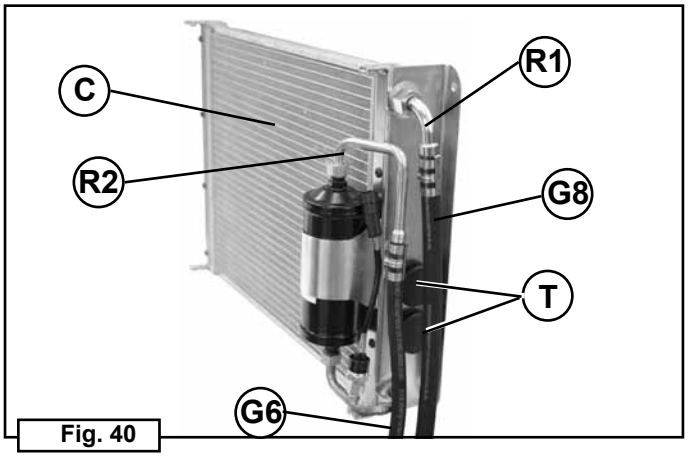


Fig. 40

1	Insert directly the two pipes gas **G6** and **G8** to condenser **C** and Lock the fittings **R1** and **R2** to the condenser **C** sse. Fig. 40, with torque value like reported on tab. 8 pag.36 **WARNING:** do not disassembly the two rubbers **T**

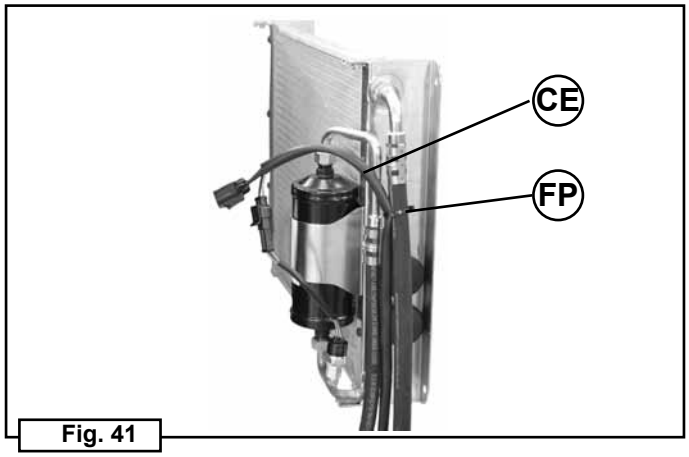


Fig. 41

2	Bended the wiring cable **CE**, to gas pipe half plastic band **FP** supplied, as showed in fig. 41

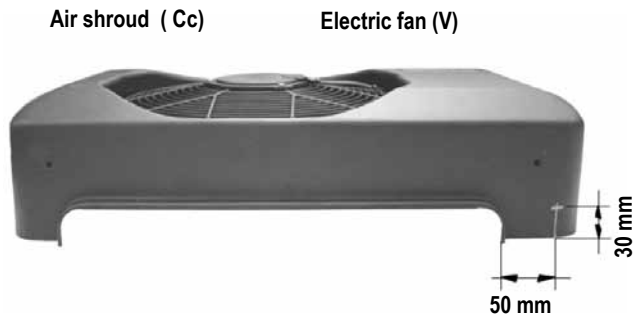


Fig. 42

3	Make the eye on plastic cover condenser **CC** for crossing pipes gas **G6**, **G8** and wiring cable **CE** with measurements reported in fig. 42-43

NB:
Operation required only for install pipes, side to condenser Gas **C** like fig. 40÷41

Fig. 43

Follow the procedure described below using a 34 mm diameter hollow mill fig. 44 and make a hole conforming to the measurements shown in fig. 42
Cut out the strip from the casing, removing it towards the outside, to obtain the opening **K** (fig. 43-45).

Fig. 44

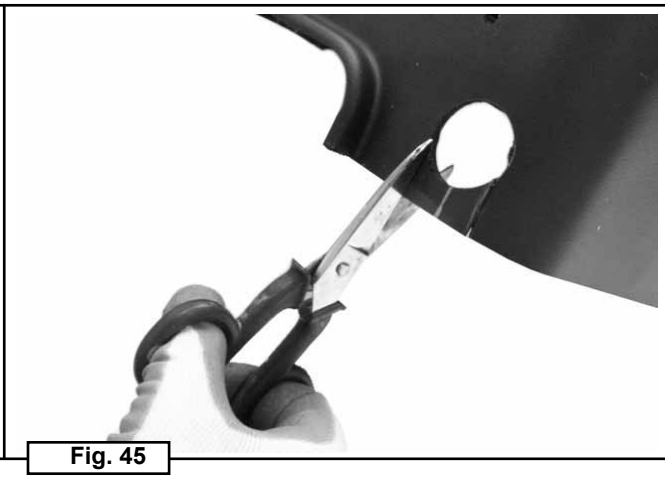


Fig. 45

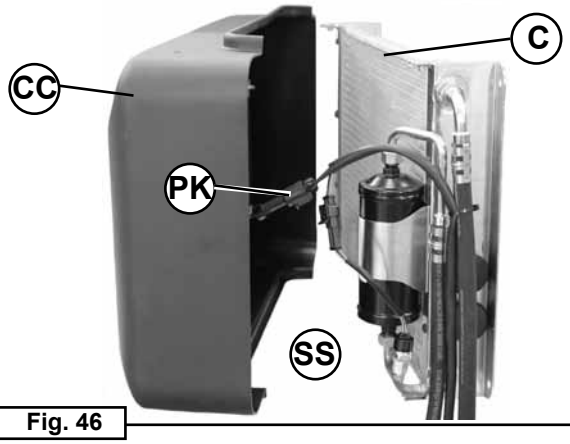


Fig. 46

5	Reassemble at the condenser **C** the plastic cover condenser **CC** modified see. Fig. 48 complete with electric connections half connectors **PK** (fan condenser) and **SS** (pressure switch) see fig. 46 Ensure the plastic cover condenser **CC** at the condenser **C** half bolts **V + R** preserved.

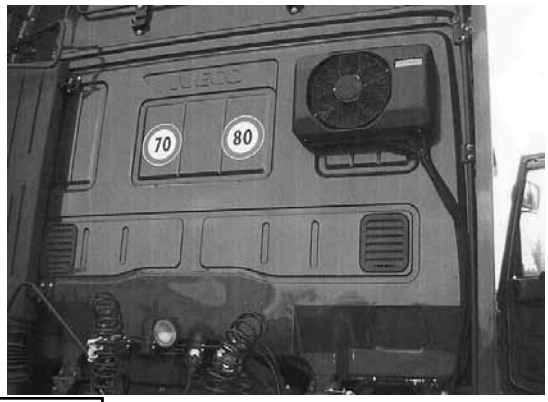


Fig. 47

6	Complete gas condenser installed (rear cab) with gas pipes to side condenser see. fig. 47

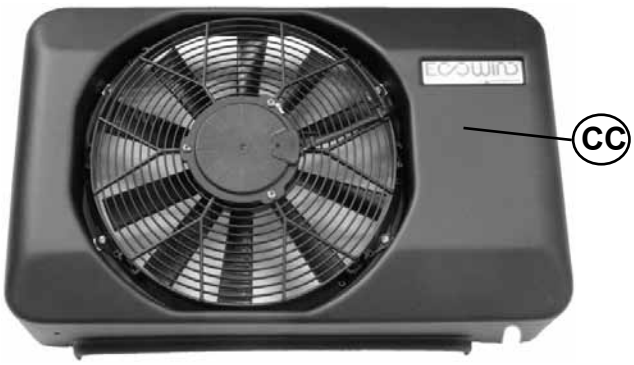


Fig. 48

3.6 CONNECTING FITTINGS - GAS HOSES

Step	Description
1	Insert clamps **CX** (Clic) into the gas pipes **Q**, (no. 3 clamps) n° 140 for pipe **G6**, n° 160 for the pipe **G8** and no. n° 185 for pipe **G10** as shown in Fig. 49 Then insert the fittings (UNF) into hoses **Q**, tighten them with the clamps using the special pliers **P** (Fig. 50-53) not supplied with the equipment. **NB:** The clamps (Clic) must be positioned as showned on Fig. 56 pag. 34 ***WARNING*** ***Make sure that the sealing gaskets (OR), provided inside the accessory packet, are correctly seated (fig. 60 pag 36).***

NB. Attention

Use CLIC clamps supplied with the equipment, related to correspondent rubber hose external diameters.

The CLIC clamp code is indicated on the same.

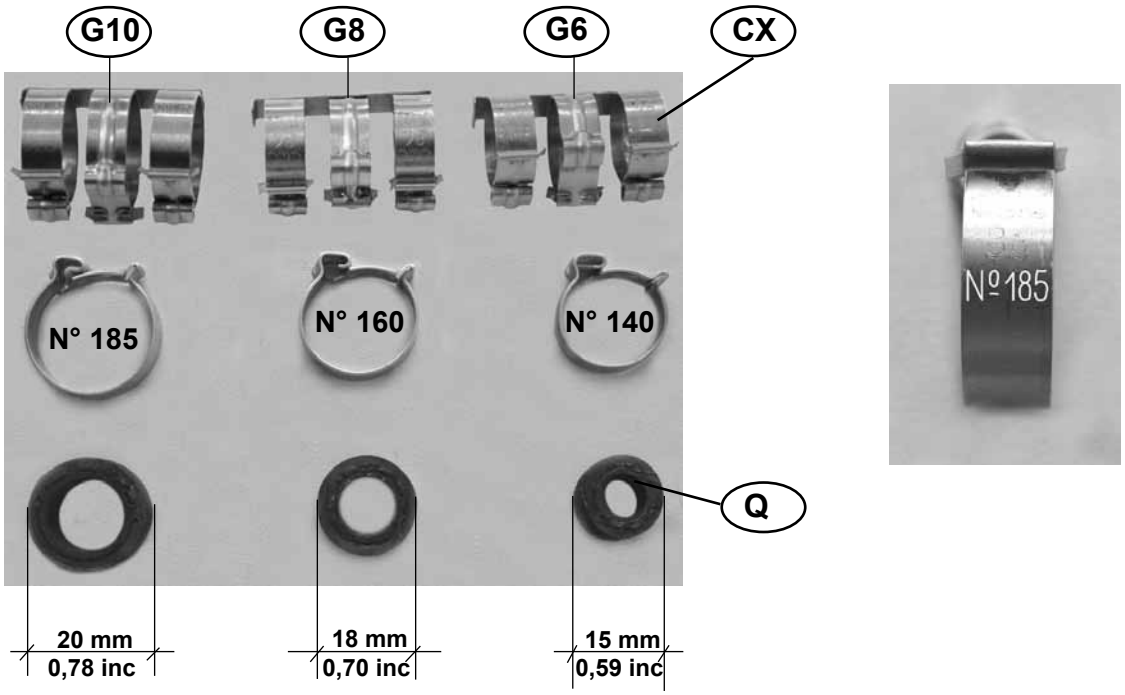


Fig. 49

WARNING!!

Only use the "clic 205" pliers (P) to tighten the clic clamps (fig. 50) Green/Orange.
A tight seal between the pipe and the union may <u>not be ensured</u> if this is not respected.

Lombardini is not responsible for any damage to people, animals and things if the tools reported in this manual are not used!!

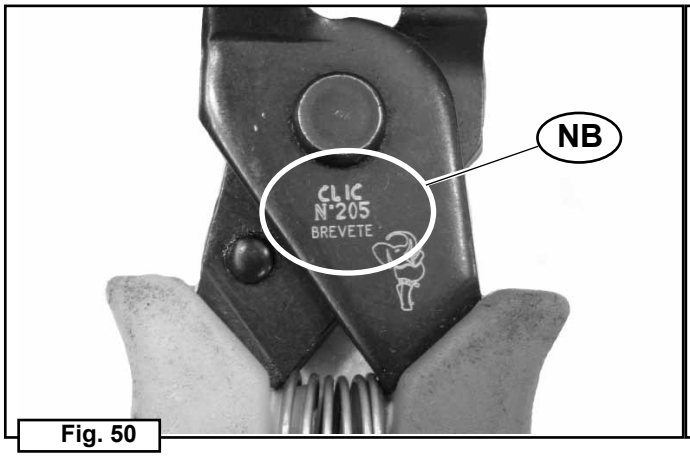


Fig. 50

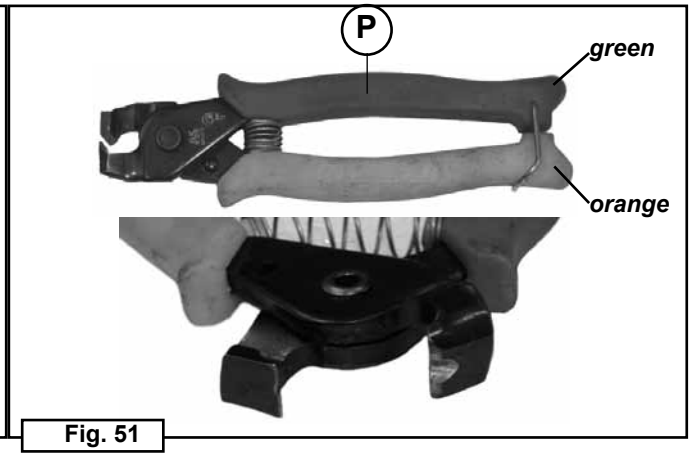


Fig. 51

attention

Lombardini Pn: ED0072 227 0 - Be order separately (not supplied in Kit Ecowind)
Caillau Pn : 54 0 000 205

Alternatively, use pliers P1 Caillau " Clic 201 " -
Caillau Pn: 54 0 000 201 – Not supplied to Lombardini

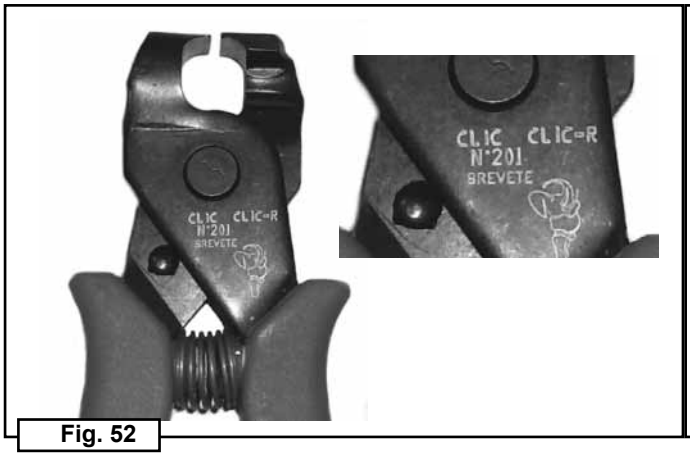


Fig. 52

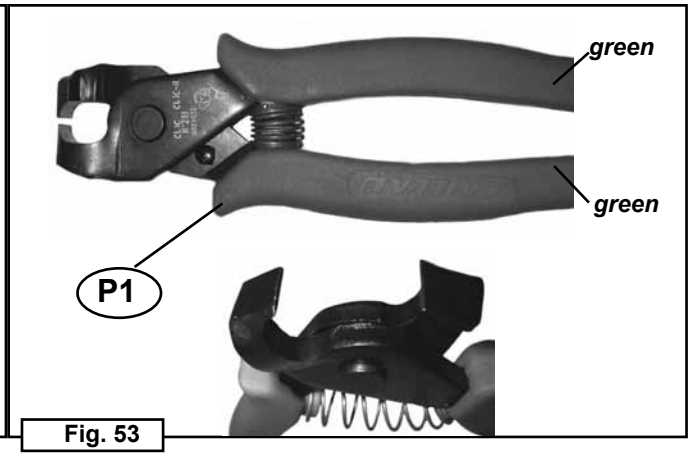


Fig. 53

FITTINGS MOUNTING

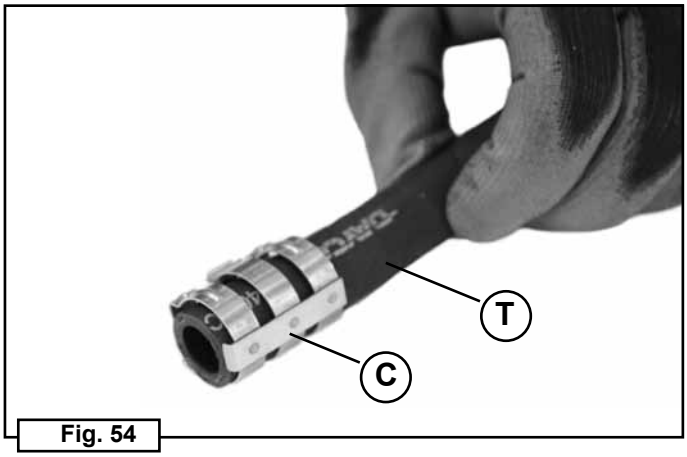


Fig. 54

Step	Description
1	Insert the clic clamp **C** as measurements indicate in fig. 49 on rubber gas hose **T** as showed in fig. 54

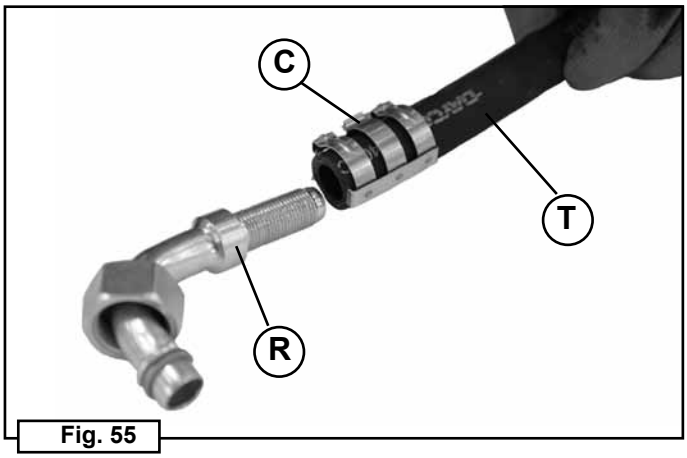


Fig. 55

Step	Description
2	Concluded the fitting gas **R** appropriate inside at rubber gas hose **T** complete of clic clamp **C**, see fig.55

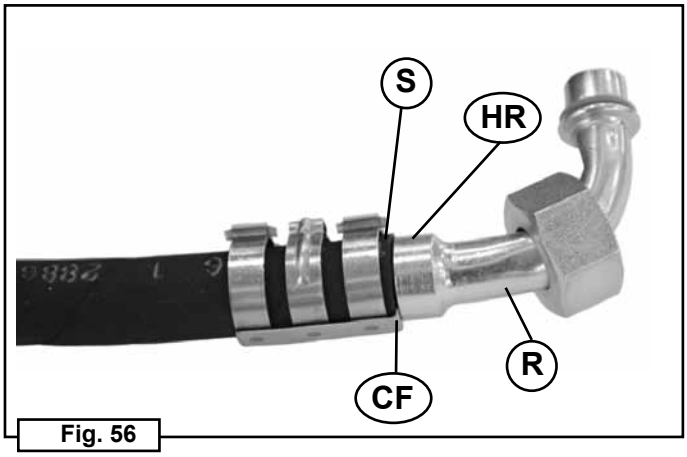


Fig. 56

Step	Description
3	Ended insert fitting **R** operation, ensure that the cir-clip fitting **HR** must be attach to the side **S** of rubber hose **T** and the stop bracket **CF** of clic clamp **C** must be between the two components **HR**+**S** as showed in fig. 56.

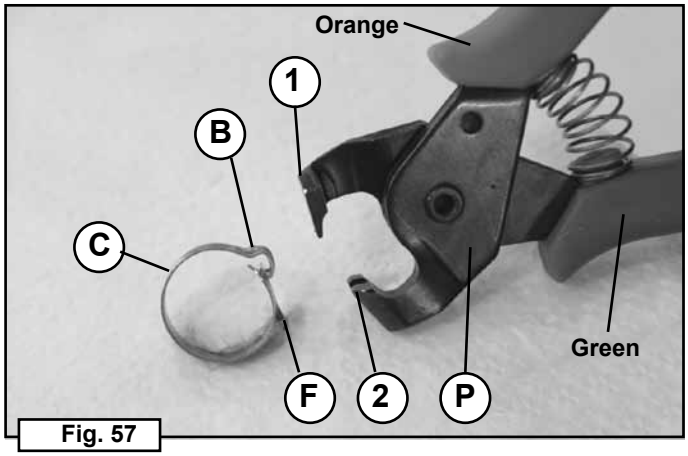


Fig. 57

Step	Description
4	Before to start the clamp fittings operation, ensure that the pliers **P** (CLIC 205 – not supplied) to be a correct position referring to clamp clic **C** as showed in fig. 57 LOCK CLAMP GREEN = 1-B ORANGE = 2-F

NW:
If used a pliers **P1** “clic 201” not supplied do not care placement pliers as described for the clic 205 version (step 4) because it have a specular profile see fig. 53.

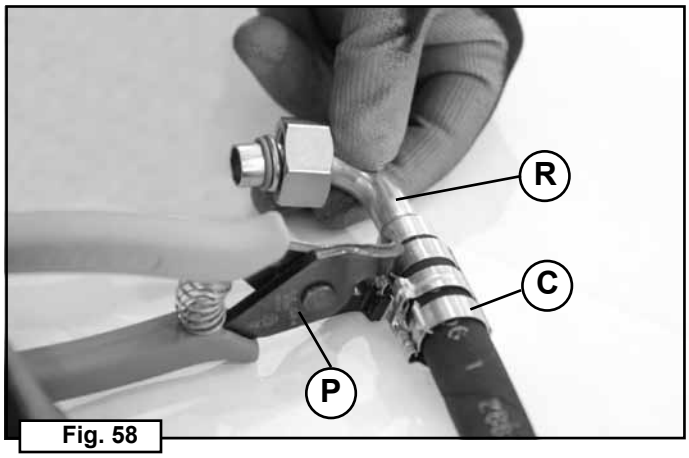


Fig. 58

Step	Description
5	Tighten the fitting **R** half pliers **P** and ensure that the clic clip **C** is closed correctly between metallic details **B** + **F** as showed in fig. 58

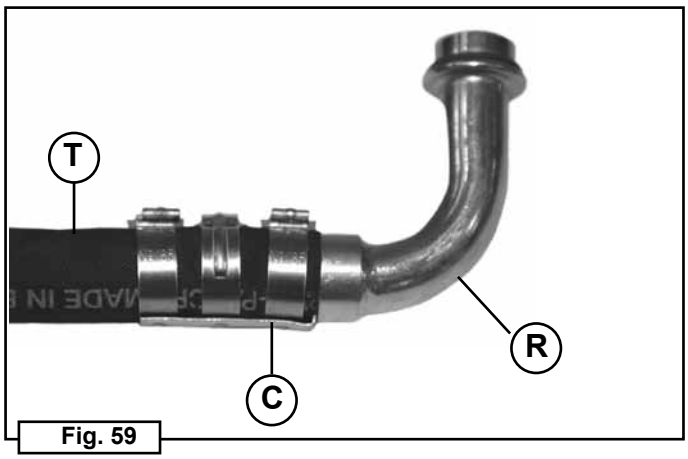


Fig. 59

Step	Description
6	At the end of operations the clamping, must be guarantee between the metallic details **T**+**C**+**R** as showed in fig. 59

Q

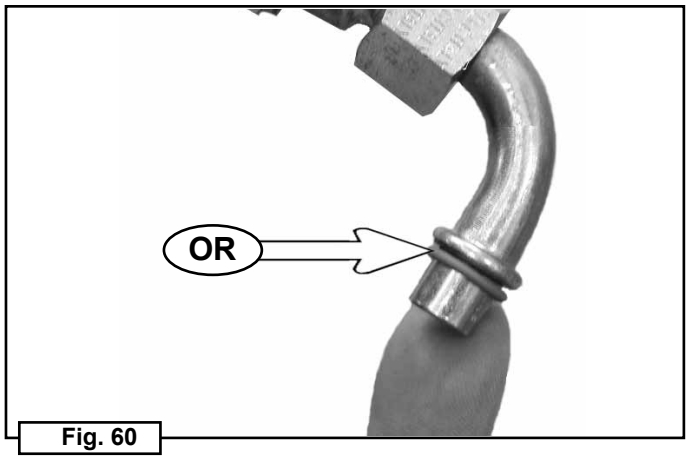


Fig. 60

7	Before to tighten fittings, always verify that there are the oring **OR** inserted see fig. 60. Remember always to lubricate and close all the fittings as recommended on tab 9 and 10

FITTINGS	MAXIMUM VALUES OF THE DRIVING TORQUES FOR GAS PIPES FITTINGS (in N.m.)
G 06 5/8"	15.4 ÷ 17
G 08 3/4"	15.4 ÷ 17
G 10 7/8"	24.4 ÷ 27
G 12 1"	24.4 ÷ 27

Tab . 8

-Lubricate all fittings and O-rings with new refrigerant oil before con-necting them

Tab . 9

- When tightening or loosening the fittings of the gas pipes, use two wren- ches to equilize the torsion couple

Tab . 10

3.7 HOSES AND CABLES CONNECTIONS TO POWER UNIT

Step	Description
1	Connect the gas delivery pipe **G8** (fig. 62) to the Power Unit using a 90° union supplied.
2	Connect the gas suction pipe **G10** (fig. 62) to the Power Unit using a 90° union supplied.

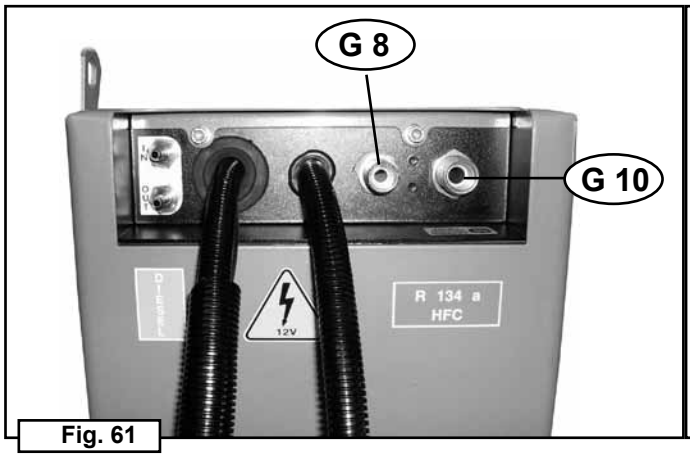


Fig. 61

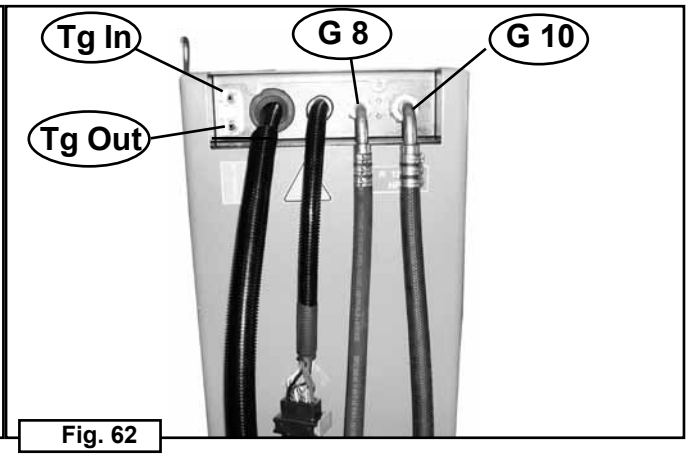


Fig. 62

Step	Description
3	Both diesel fuel couplings **Tg in** – **Tg out** must be connected by means of the supplied Ø 5 rubber hose to the corresponding couplings on the diesel fuel suction pipe (see fig. 73 on page 41) and clamps supplied.

ATTENTION! ! !

The diesel fuel on/off cock "R" (supplied), which is a system safety device, must be connected to the diesel fuel pipe "IN" (fig. 63), see also fig. 73 pag. 41.
Lombardini declines all responsibility for damage caused as a result of non-observance of the safety system.

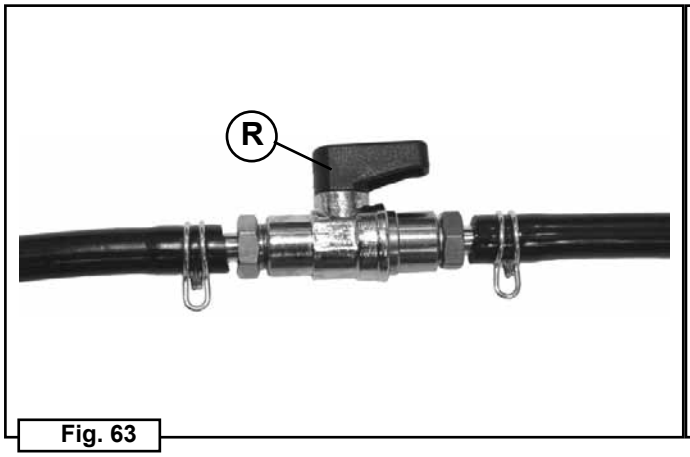


Fig. 63

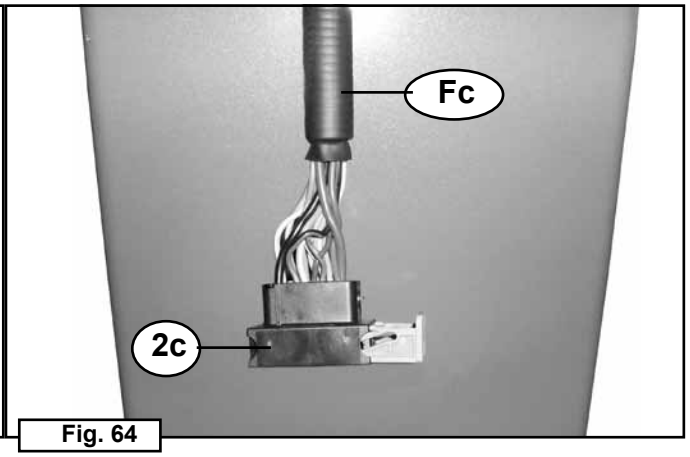


Fig. 64

Step	Description
4	The connector bundle **2c** (fig. 64) must be connected to the respective FRAMATOME **3c** connectors of the extension **P** supplied fig. 66.

Step	Description
5	Connect the cable bundle **Fc** from the Power Unit to the extension **P** supplied by inserting FRAMATOME connectors **2c**, in the connectors **3c** (fig. 65-66).
6	Connect the Power Unit's power cables **La** to the supplied power cable extension **Pa** by joining the two connectors **A1** and **A2**. See fig. 65-66. **NB:** After this operation is complete, it is RECOMMENDED that the two connectors **A1** and **A2** be secured with a nylon clamp **CN**, as shown in figure 69.
7	After completing all connections, connect the red cable of the extension (**Pa**), complete with electrical power fuse **FS** (fig. 68), to the positive pole of the vehicle's original batteries (fig. 67).
8	Next attach the other eyelet of the black cable **Pa** of the extension to the negative pole ⏚ of the battery (fig. 67). **WARNING: The black cable must be connected to the battery!!! And not to the frame!!!**
9	***WARNING*** ***Make sure the supply red cable is firmly attached (Pa) , avoiding points that are mobile or subject to rubbing, and not allowing it to hang, to prevent tearing or contact with the vehicle frame which might cause damage to the electrical/electronic circuit in the system or the vehicle's battery.***

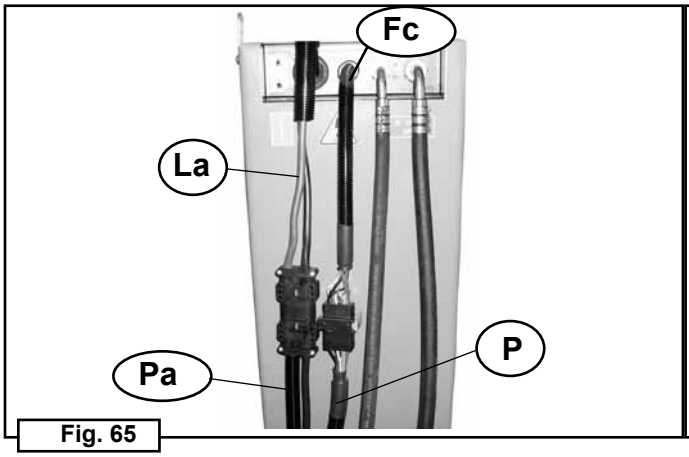


Fig. 65

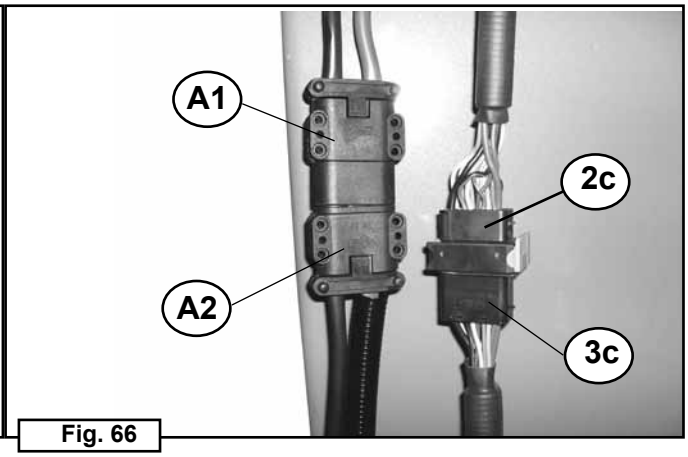


Fig. 66

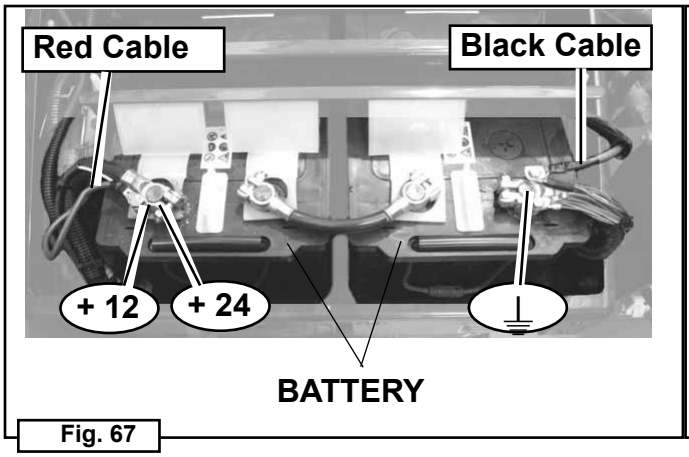


Fig. 67

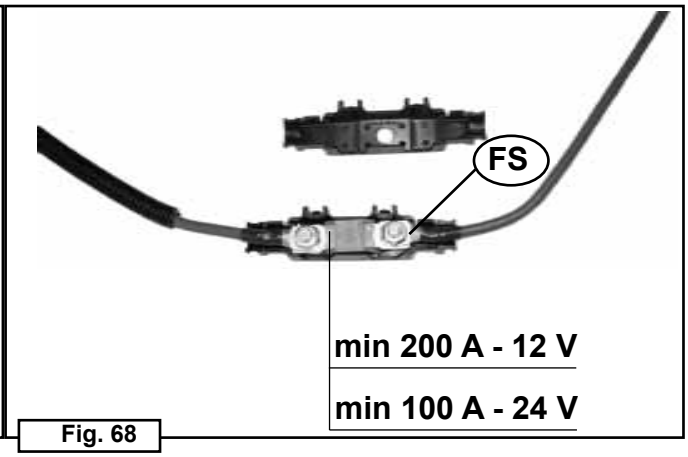


Fig. 68

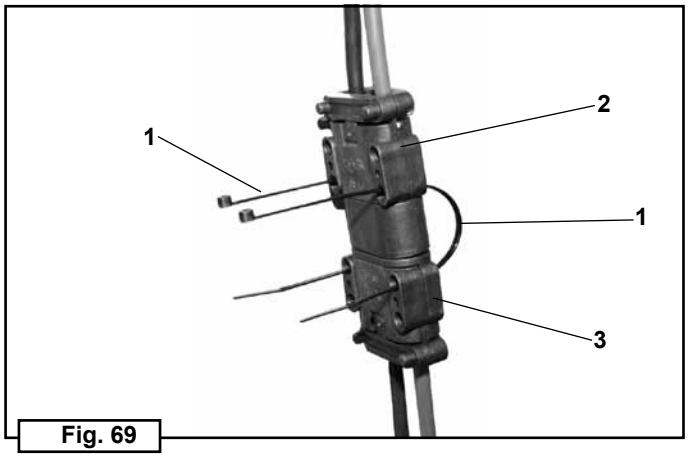


Fig. 69

10	After attaching the connectors toghether, insert the two plastic clamps supplied and fasten the battery connectors fig. 69.

Security Harness Connector

1. Plastic clamps, qty. 2
2. Connector, power unit side
3. Connector, battery power cable

3.8 CONNECTING DIESEL TO THE POWER UNIT

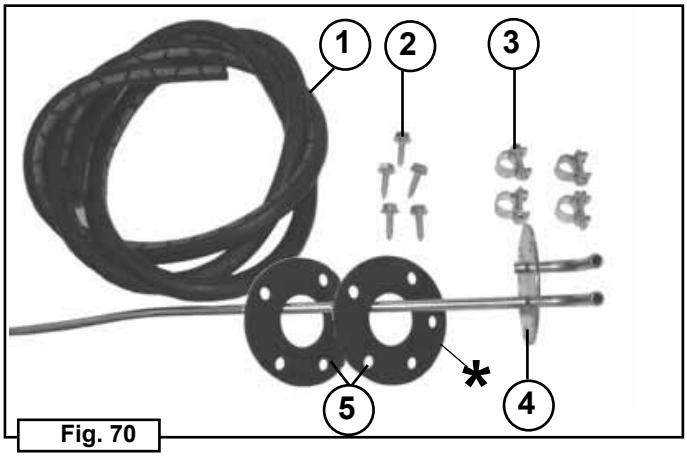


Fig. 70

Legend:

1. rubber hose Ø 5 mm .....6 m
2. self-threading screws .....qty 5
3. clamps .....qty 4
4. suction pipe .....qty 1
5. gasket .....qty 2

Supplied in Kit

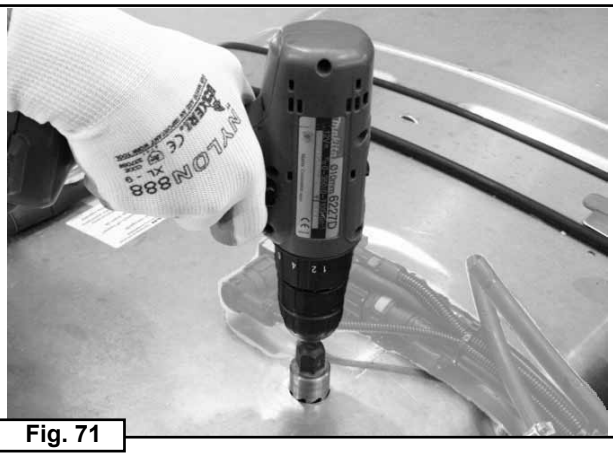


Fig. 71

1	Find a flat position on the upper part of the vehicle's tank.
2	Bore using a hollow mill Ø 34 mm, taking care to prevent the cut disc and milling chips from falling into the tank (fig. 71).

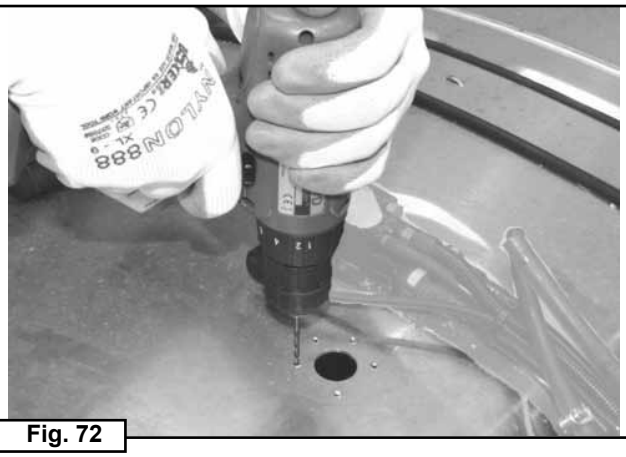


Fig. 72

3	Bore using a Ø 3 mm bit after tracing the fixing points of the suction pipe, using the gasket **G** as the template (fig. 72)

Step	Description
4	Cut the metal suction pipe to the appropriate size as in figure 73.

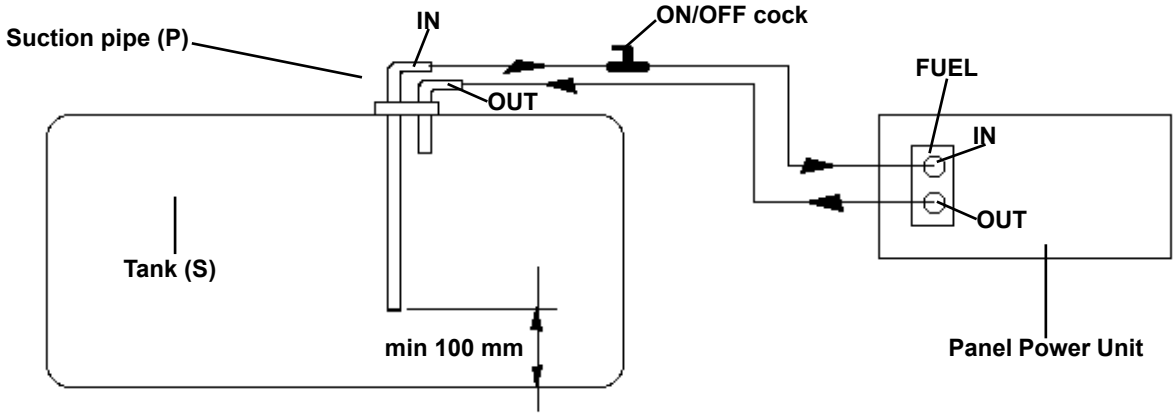


Fig. 73

Step	Description
5	Attach the suction pipe **P** to the tank **S** using the supplied self-threading screws, placing the rubber gasket **G** between the two (fig. 74-75).

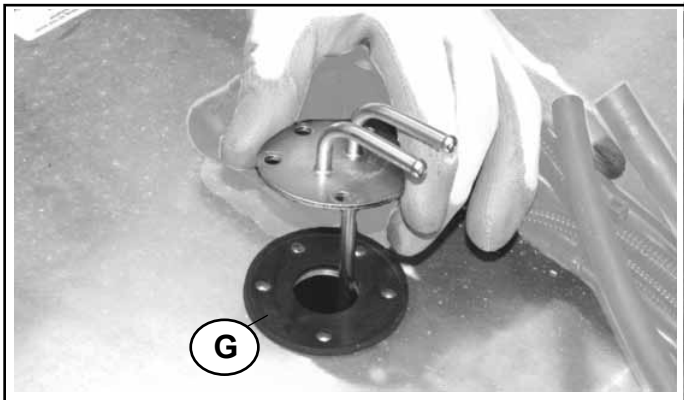


Fig. 74

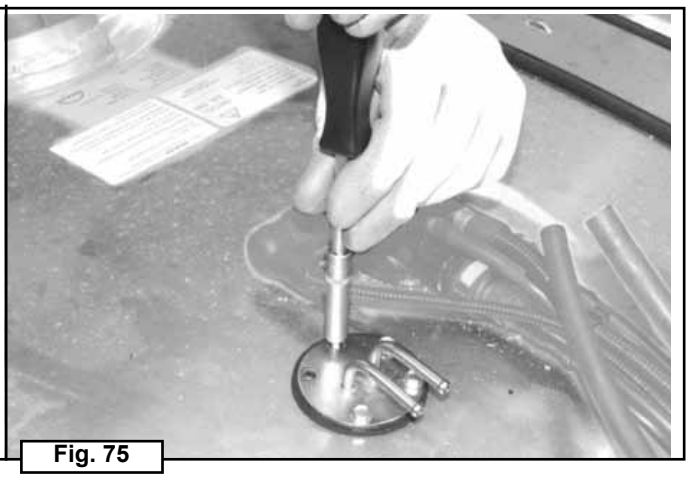


Fig. 75

Step	Description
6 *	For tank with cylindrical shape, we suggest to use 2 rubber gaskets **G** fig 70

Step	Description
7	Connect the suction pipe **P** to the Power Unit **PW**, via the supplied rubber hose and metal clamps (fig. 76).

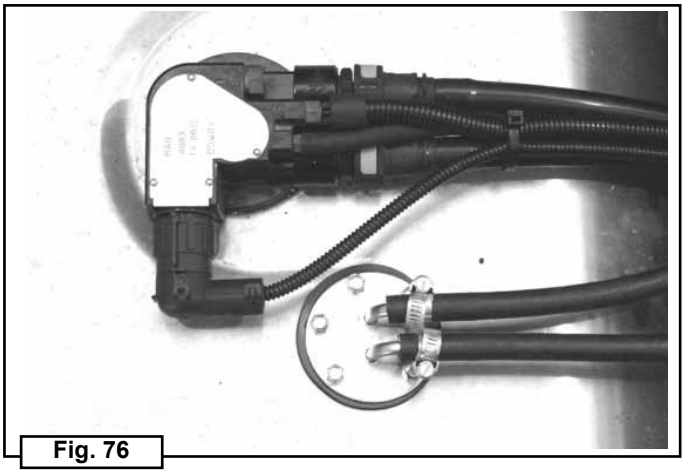


Fig. 76

ATTENTION! ! !

The fuel intake pipe (IN) of the suction pipe (P) must be connected to the safety cock (R) (fig. 73) and to the coupling IN on the Power Unit.
NON-OBSERVANCE OF THIS STEP COULD PREVENT THE SYSTEM FROM FUNCTIONING! ! !

3.9 INSTALLATION OF THE SPLIT UNIT

Step	Description
1	Loosen and remove the 8 self-threading screws **N** holding the four sides of the cover **M** and remove it by disconnecting the connectors **C**. Take care not to disconnect the cables on the inside split fig. 77-79.

WARNING

The position of the split unit inside the cab must be agreed between the installer and the final customer (vehicle owner) before installation.

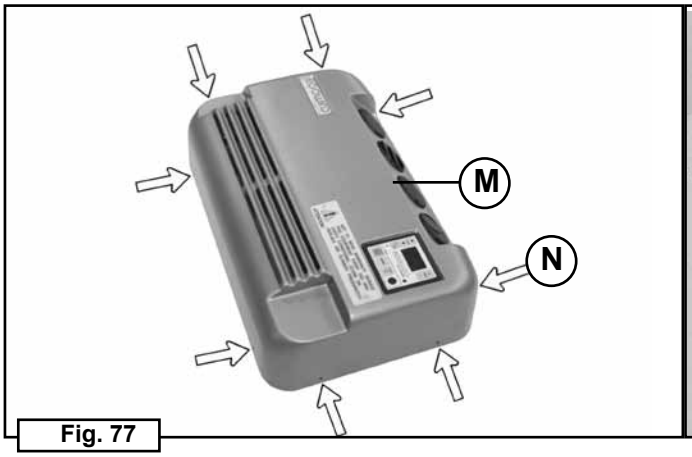


Fig. 77

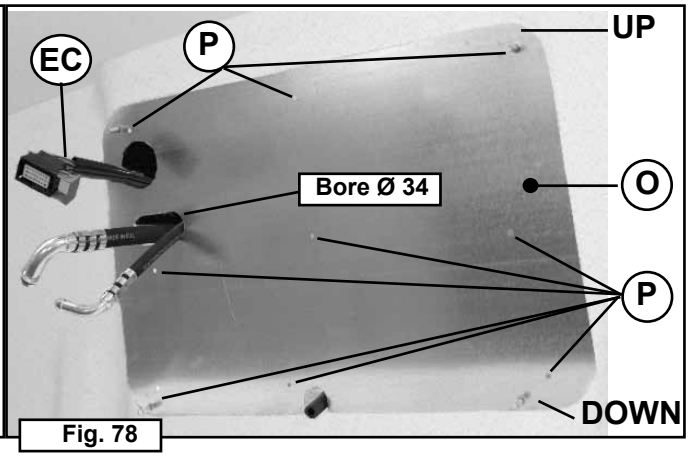


Fig. 78

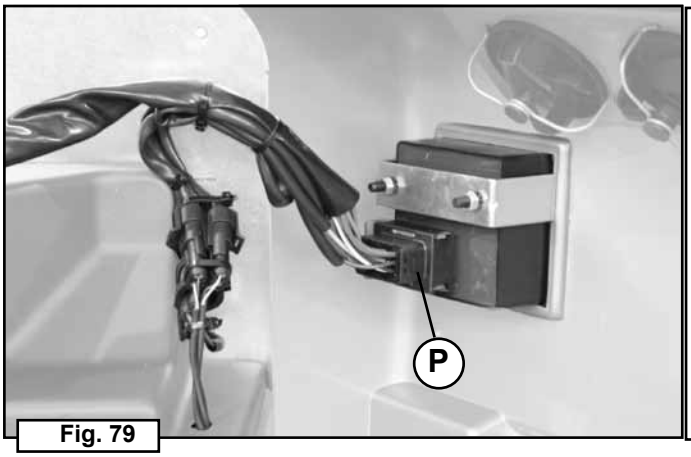


Fig. 79

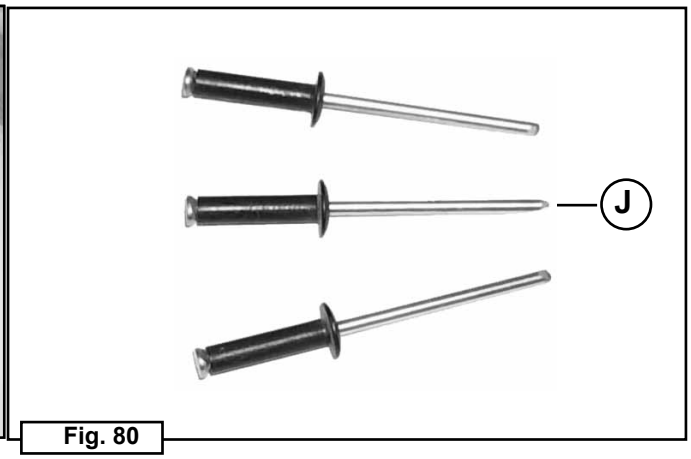


Fig. 80

INSTALLATION OF THE SPLIT-UNIT

Step	Description
2	Position the counter frame **O** fig. 78 supporting the split unit inside the cab. Use the split unit as a template taking care to place it against a flat wall and to keep it ABSOLUTELY HORIZONTAL. ***WARNING*** ***The counter frame unit (O) must be correctly positioned in conformance with the above instructions, to prevent condensed water from leaking out.***
3	Then mark 9 boring points referring to the holes **P** on the counter frame and keeping to the measurements shown in the diagram in fig. 81 (*).
4	Using a Ø 6mm bit, bore 9 holes in the marked places.
5	Firmly secure and attach the counter frame **O** using the supplied "**Graf J**" rivets fig. 80.

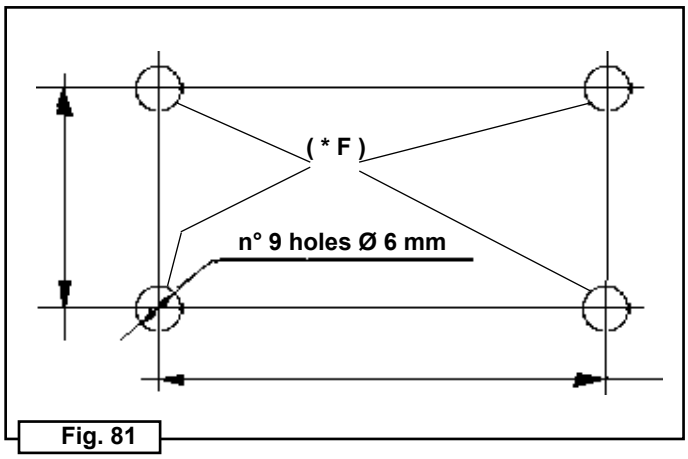


Fig. 81

N.B. : Before attaching the split unit to the cab, make holes to pass pipes and cables !!!

WARNING!

Pay special attention and take particular care during the drilling phases, to prevent the cab internal upholstery from being damaged!!

RECOMMENDATION FOR BORING PROCEDURE

Step	Description
6	Using a hollow mill, bore through the pressed cardboard wall inside the cab and the sheet metal of the rear of the cab, in the same position as the existing openings on the counter frame for the passage of the following connections: fig. 82 (**Q**): gas pipes (make opening only in inner wall) Ø 34 mm; (**R**): electrical system Ø 50 mm; (**S**): condensation drainage pipe Ø 34 mm.

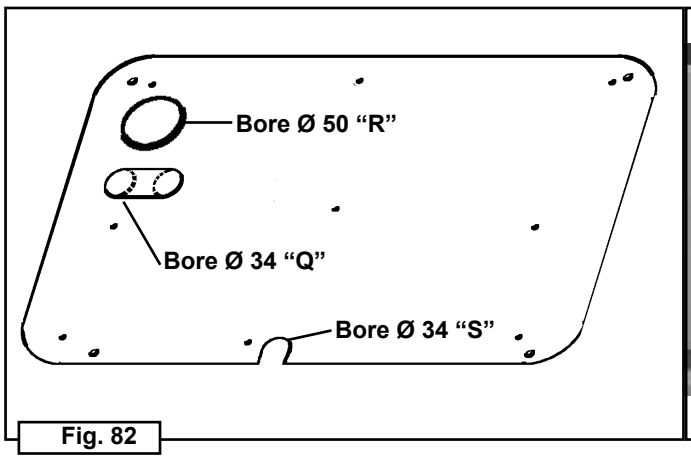


Fig. 82

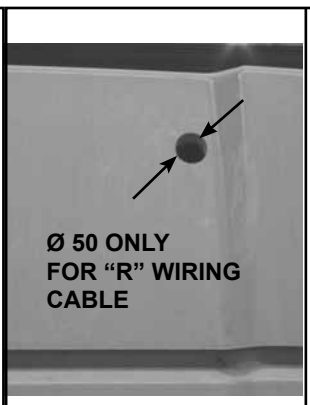


Fig. 83

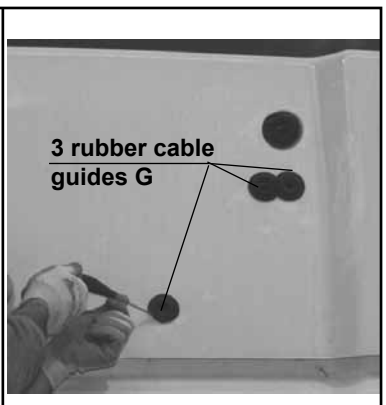


Fig. 84

Step	Description
7	After the drilling operations are completed, insert the 3 supplied **G** rubber cable guides into the holes to 34 mm and made in the exterior metal of the cab (fig. 84).

N.B.: The rubber to wiring **R** are already assembled on the external cable **EC**

Step	Description
8	During the SPLIT fastening phase, accurately check if the latter is fixed as shown in figure 85, pos. **1**. If the wall inside the cab is tilted on the front, use two bored spacers **D** with a min. internal Ø of 6.5 mm, (not supplied due to the continuous dimensional variability **H**). They must be inserted in the two lower pins **P** on the counter frame, as shown in fig. 78, pos. **down**. **WARNING!** **It is strictly forbidden to fix the SPLIT as shown in fig. 85, pos. 3.** **Non-observance of this regulation could lead to drainage problems of the condensation produced by the SPLIT that may leak inside the cab.** ***Lombardini S.r.l declines all responsibility for damage to persons or things caused by non-observance of this regulation.***

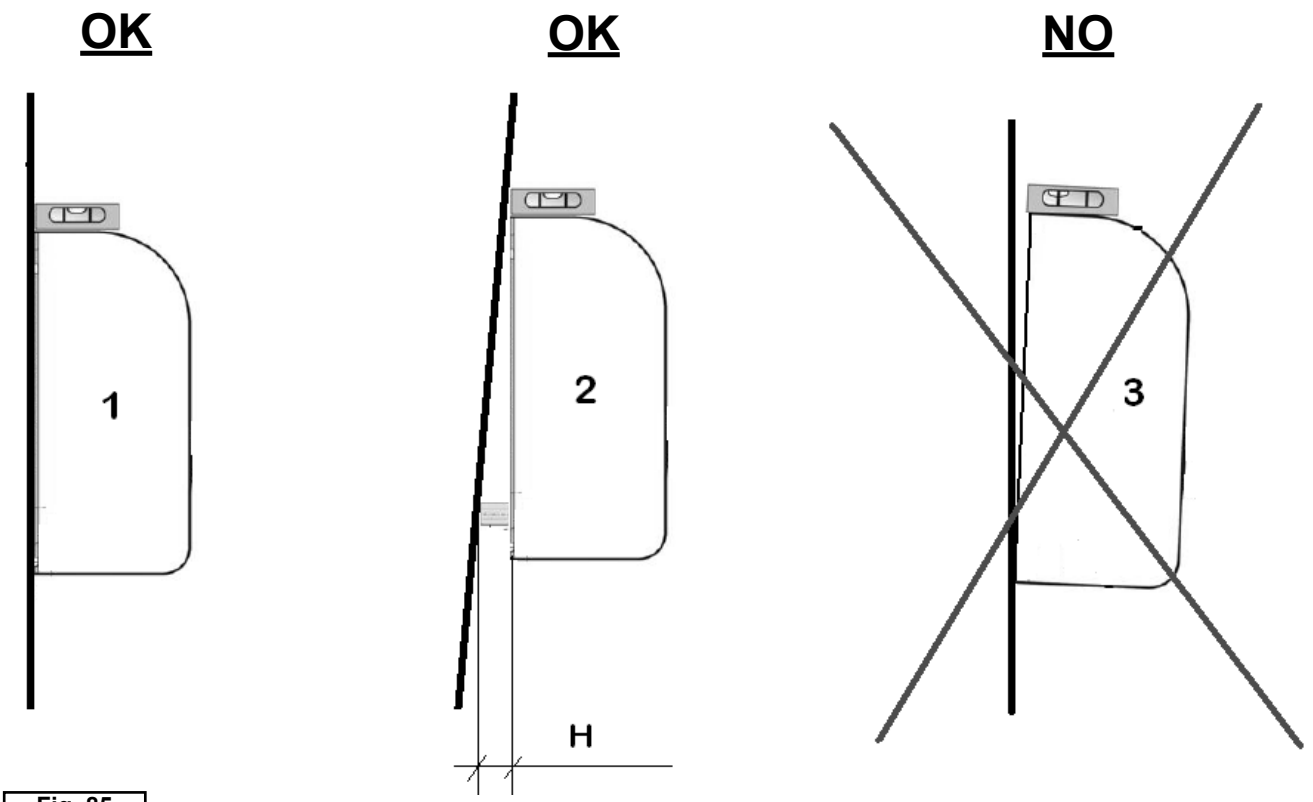


Fig. 85

3.10 FASTENING THE PIPES AND CABLES - Fixed cab version

Step	Description
1	After fixing the Power Unit / Condenser / Split unit, proceed to fasten and close pipes and cables, according to the following two procedures (fig 86).

CONDENSER/CAB METHOD

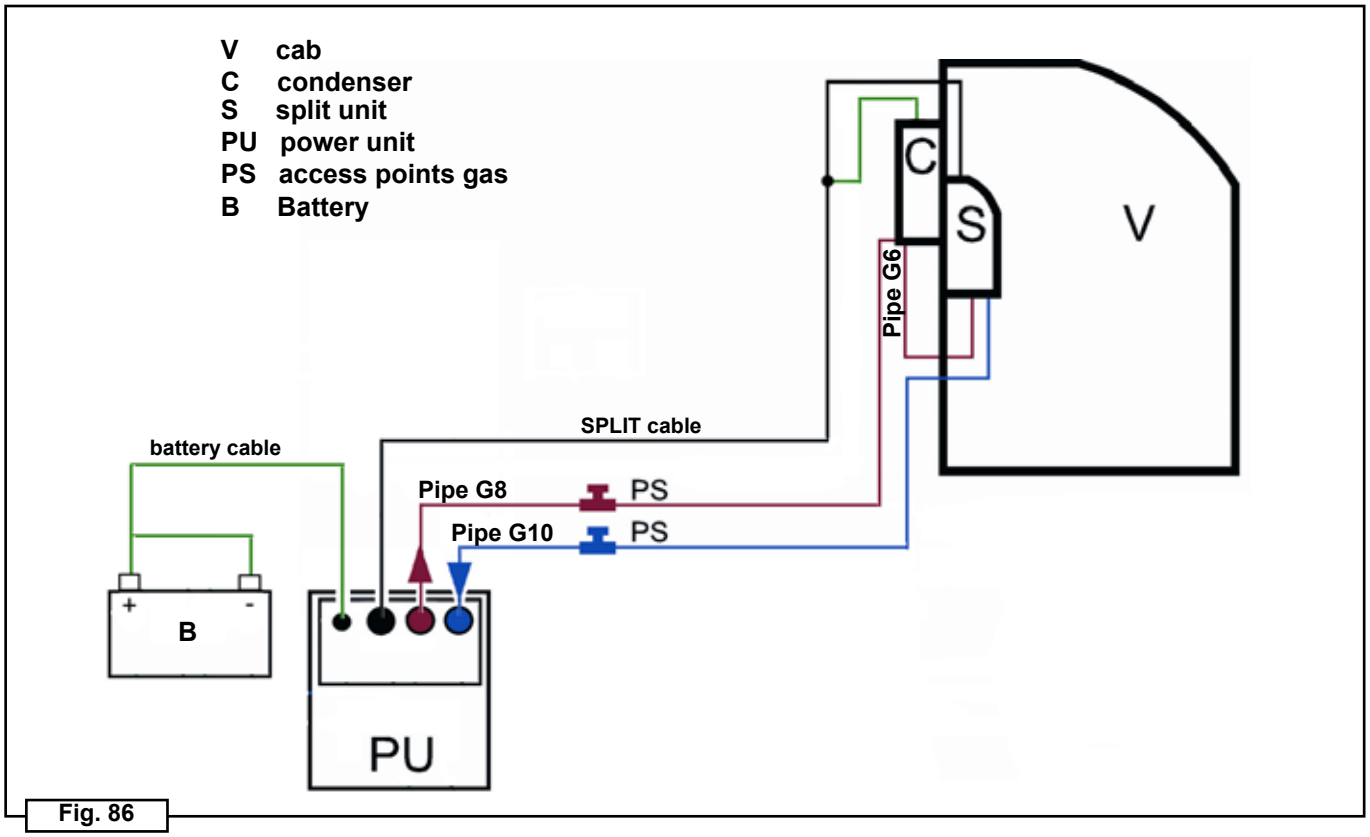


Fig. 86

CONNECTING PIPES AND CABLES TO THE CONDENSER

Step	Description
1	After fastening the pipes and cables to the vehicle frame, proceed by passing the tube bundle towards the condenser like options 1st or 2nd to pag 26÷30.
2	Continue attaching the pipes on the outside, boring through the rear of the cab using a 3.5mm bit, and inserting the steel/rubber clamps **FG** around the pipes. Fasten using the supplied self-threading screws (fig. 87).

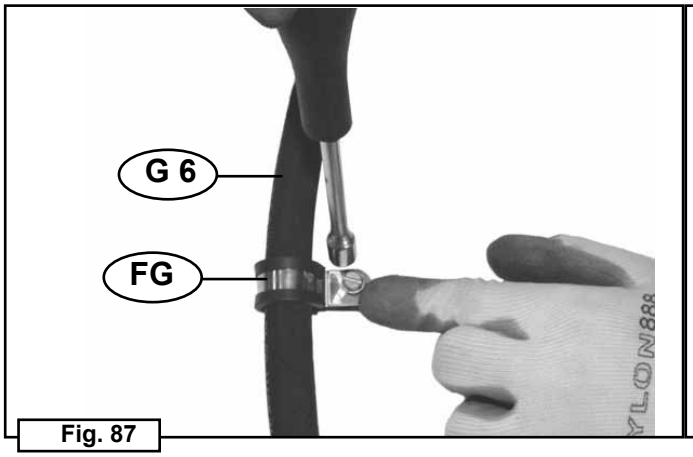


Fig. 87

Fig. 88

Attention!

Make sure that the curvature of the pipes R during passage from the vehicle frame to the back of the cab has been checked and is adequate (fig. 89)
Non-observance of this point could lead to the pipes being crushed, thereby compromising the performance of the system.

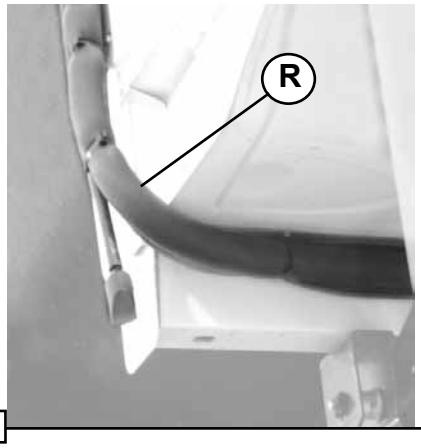


Fig. 89

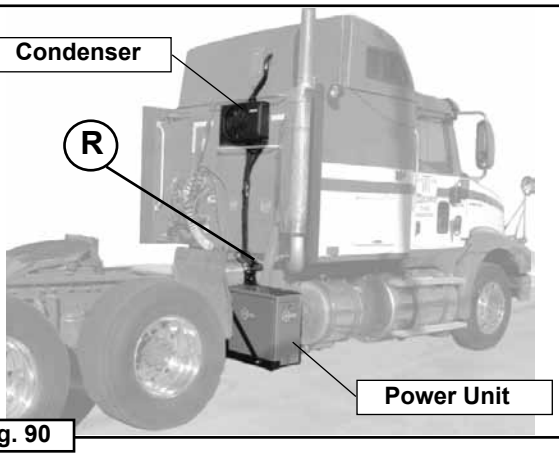


Fig. 90

Attention!

The condenser mounting operation given above is only indicated for vehicles with a fixed cab (bound to the frame) and not for models with forward tipping cabs!!! Fig 86-90

ECOWIND by Lombardini declines all responsibility for damage caused to things, persons, animals, the vehicle and the ECOWIND system as a result of non-observance of this regulation!!!

3.10_B FASTENING THE PIPES AND CABLES - Tipping cabs

Step	Description
1	After fixing the Power Unit / Condenser / Split unit, proceed to fasten and close pipes and cables, according to the following two procedures fig. 91

CONDENSER/CAB METHOD

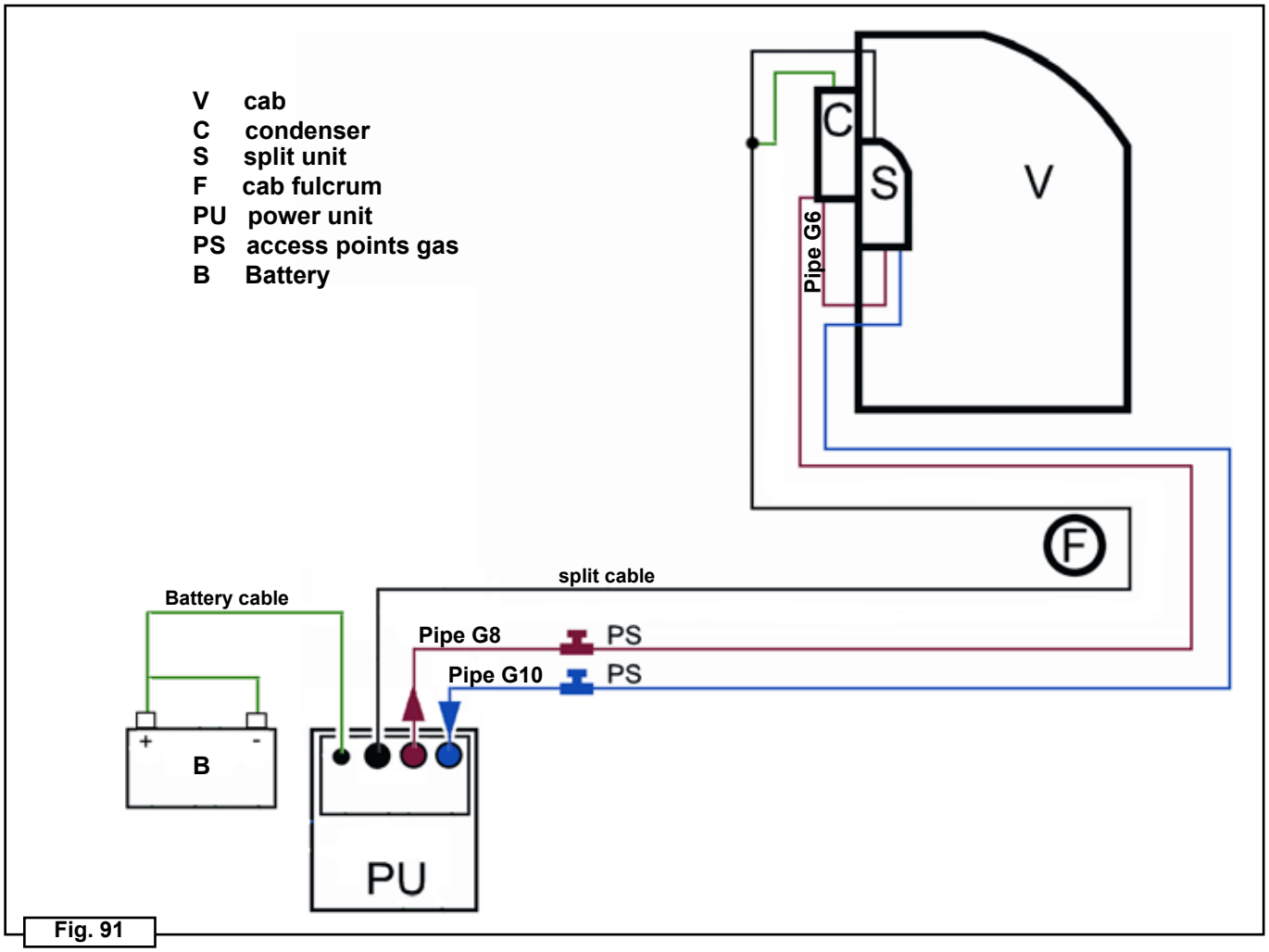


Fig. 91

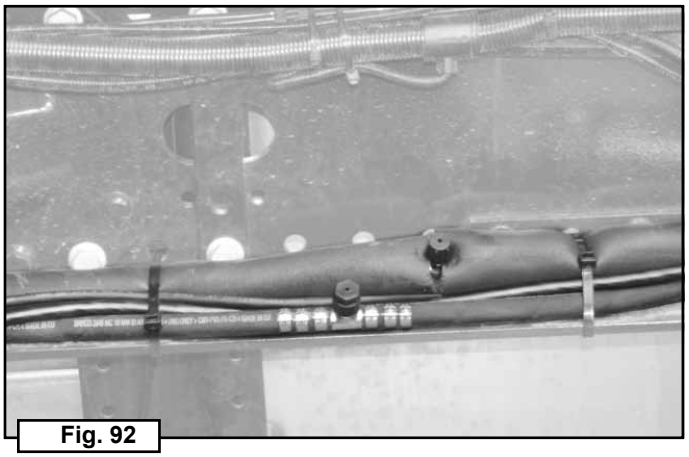


Fig. 92

Step	Description
2	After fastening the Power Unit, overturn the vehicle cabin and fasten the gas pipes and the electrical cables (regardless of the position in which the condensing unit has been installed) to the vehicle frame using steel, rubber and plastic clamps and a range of nuts and bolts supplied with the system, as far as the rotation fulcrum point **F** of the cabin, fig 92-93-94.

Fig. 93

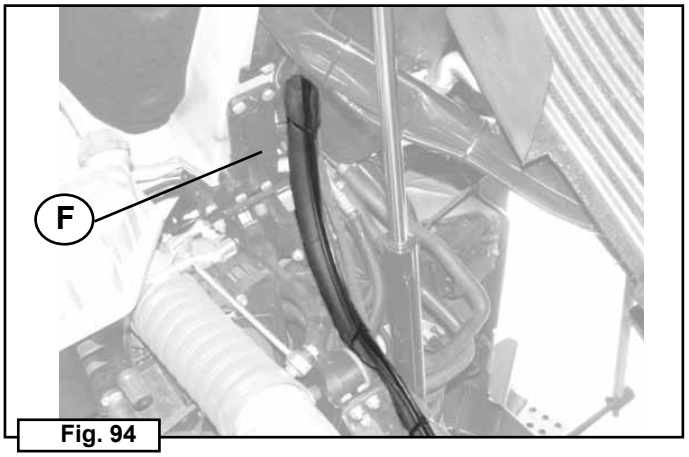
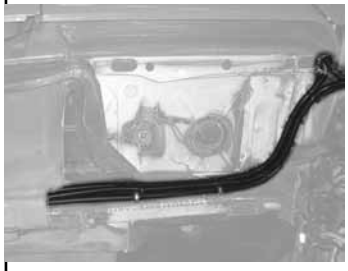


Fig. 94

Step	Description
3	***WARNING*** **While positioning, remember to protect the ends of the GAS G6 / G8 / G10 pipes with adhesive tape, in order to prevent entry of impurities or residues dangerous to the passage of the coolant.**
4	When possible, use the existing original tube bundles (fig. 95), in order to use only the plastic clamps supplied, to prevent perforation. When this method is used, it is necessary to determine the best passage taking the pipes and electrical cables to the peripherals.



down floor cab

Fig. 95

Step	Description
5	When the cab rotation fulcrum point **F** has been reached (fig. 95), fix the tube bundle to the the cab and down floor cab (fig. 95), boring holes (Ø 3,5 mm) and using steel/rubber clamps along with self-threading screws supplied with the system.

Step	Description
6	After fastening the pipes and cables under the cab floor, proceed with the tube bundle towards the condenser. (Attached previously) fig. 96.
7	Continue attaching the pipes on the outside, boring through the rear of the cab using a 3.5 mm bit, and inserting the steel/rubber clamps **FG** around the pipes. Fasten using the supplied self-threading screws fig 96.

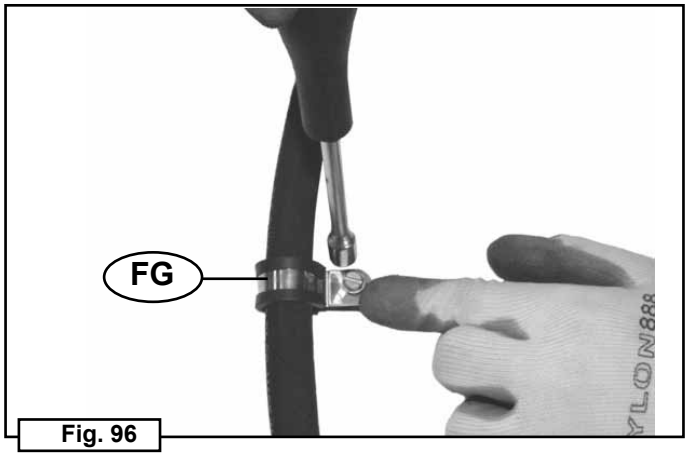


Fig. 96

Step	Description
8	Pipe and wiring, at the finished installation on the floor and back cab fig. 97

Fig. 97

Step	Description
9	Gas delivery pipe **G8** and inlet pipe **G10** must be connected with 180° unions with access points (Fig. 98 L and 99) necessary for gas recharge **AC**. The position of the same must be of easy access to allow to insert gas charger station valves. For unions tightening operations see instructions reported

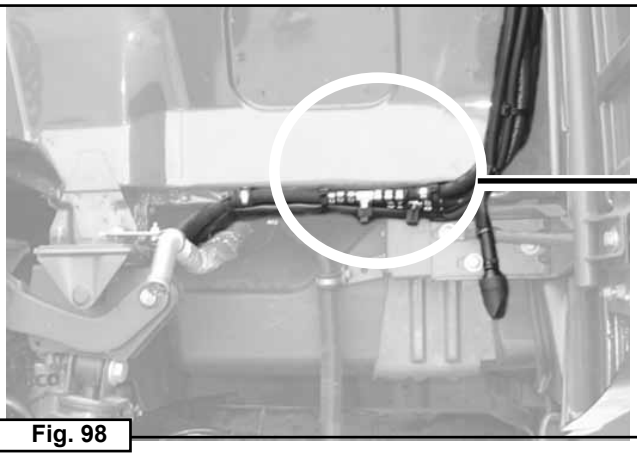


Fig. 98

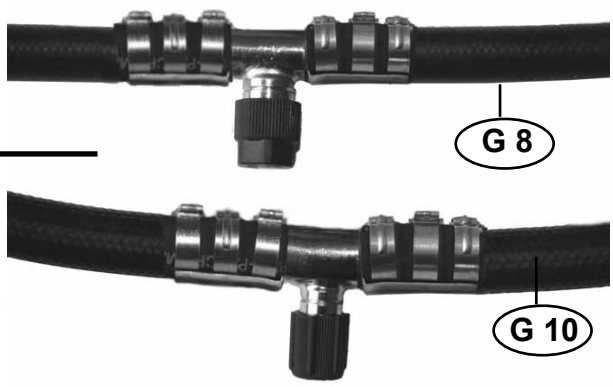


Fig. 99

Step	Description
10	**ATTENTION** **Regardless of the method used to attach the condenser, it is absolutely essential to create the pipe and cable circuit by passing through the cab fulcrum point F, as shown in (fig. 100), in order to avoid serious damage to the system, to parts of the cab and lifting system.** **ATTENTION** **Lombardini S.r.l. declines all responsibility for damage caused to things, persons, animals, the vehicle and the ECOWIND system as a result of non-observance of this regulation fig. 101.**

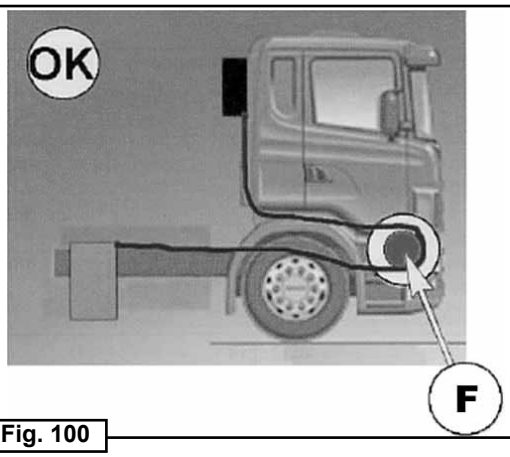


Fig. 100

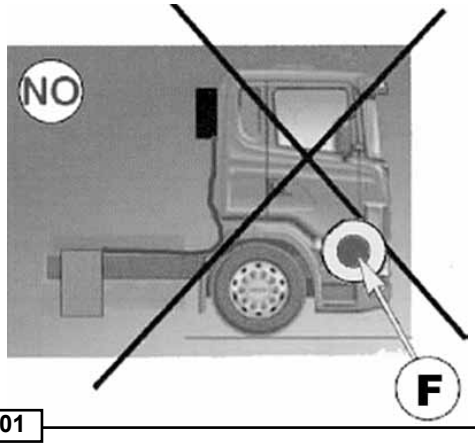


Fig. 101

Step	Description
11	After attaching the condenser **CO** connect the pipes and cables from the condenser to the split unit inside the cab. Insert pipes **G6** – **G10**, the split command cables **W** in the hole **R** and the condensation drainage pipe **D** in the rubber cable holders **G** and push them through the slots in the counter frame (fig. 102-103).

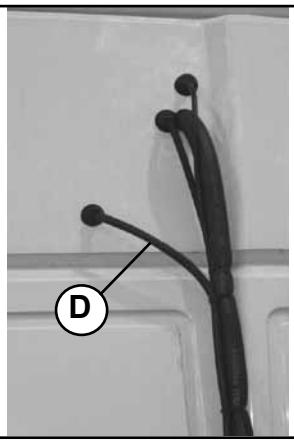


Fig. 102

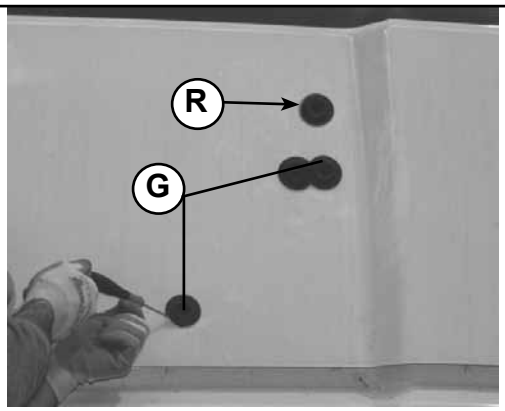


Fig. 103

Step	Description
12	Pass them through the internal holes, previously made in the pressed cardboard attached to the counter frame **O**. Make sure that the condensation drainage pipe **H** exits the lower hole (fig. 104).

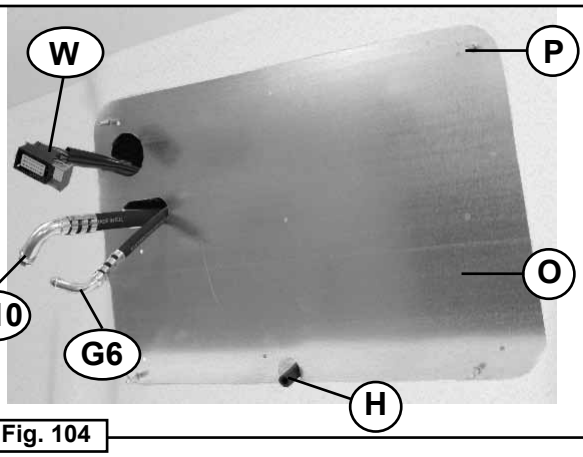


Fig. 104

Step	Description
13	Secure the split **S** to the counter frame **O** by sliding it onto the 4 Stud M6 **P** and then fasten it using Ø 6 washers and the M6 AB nuts provided (fig. 105)

Warning!!

Before performing the operation mentioned above, make sure that the condensation drainage pipe (H) is securely fastened to the plastic coupling (I) on the split's base (fig. 106).

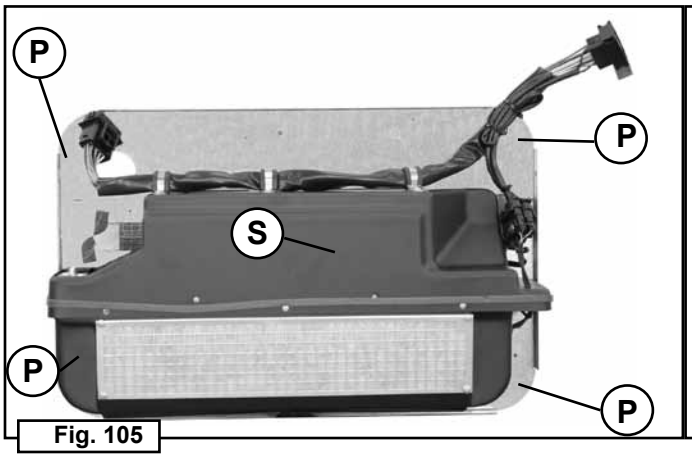


Fig. 105

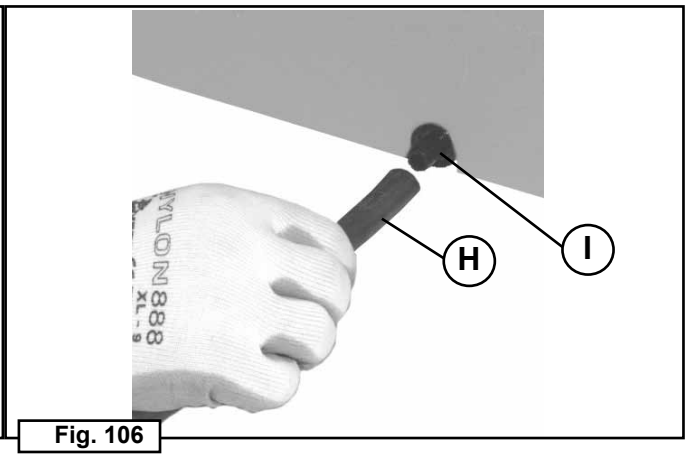


Fig. 106

Warning!!

INSTALL KIT "ANTIPOLLUTION FILTER D" (SUPPLIED WITH THE EQUIPMENT*) Fig. 108 WITH SELF-THREADING SCREWS C, AS INDICATED IN FIG. 107

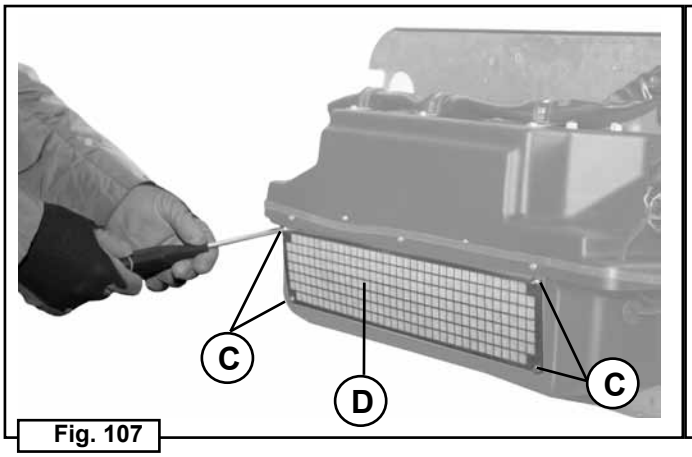


Fig. 107

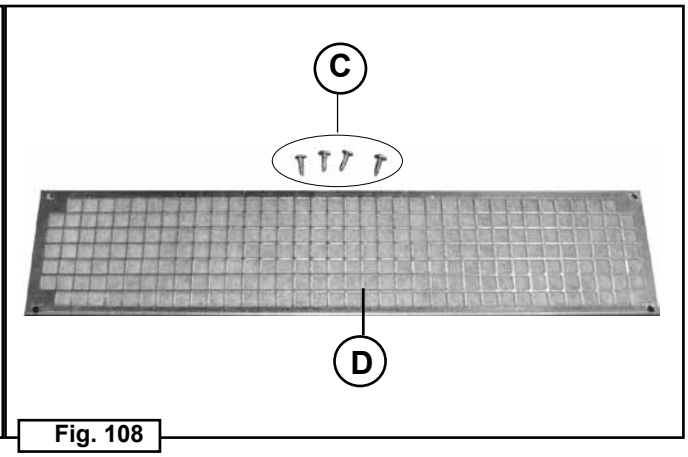


Fig. 108

SPLIT CLOSING

Step	Description
1	Connect the SPLIT/EXTENSION cable connections by joining the FRAMATOME **FR** connectors (see fig. 110). Cut rubber hoses **T6** and **T10** to the right size fig. 112. Insert the couplings and clic clamps (fig. 111) referring to **page 32÷36** for the torque. Close the cooling circuit, inserting the fittings **G6** and **G10** into the expansion valve **E**, and fasten (fig. 113) using the flange **Ff**, screw **Vt** and washer (fig. 113).

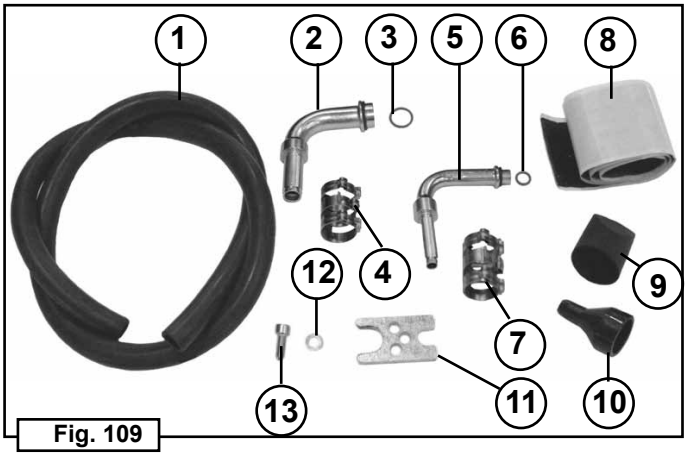


Fig. 109

LEGEND

1 Condensation drainage pipe
2 Union **G10** 90° **FL**
3 OR G10
4 Clic clamp 185
5 Union **G6** 90° **FL**
6 OR G6
7 Clic clamp 140
8 Insulating mastic
9 Diffuser
10 Diffuser support
11 Valve flange
12 Ø 6 Washer
13 TCEI M 6x16 Screw

Step	Description
2	Before tightening the flange on the flanged unions fig. 113, make sure that you have inserted (if not already done) the supplied **OR G6** and **G10** (see fig. 112).

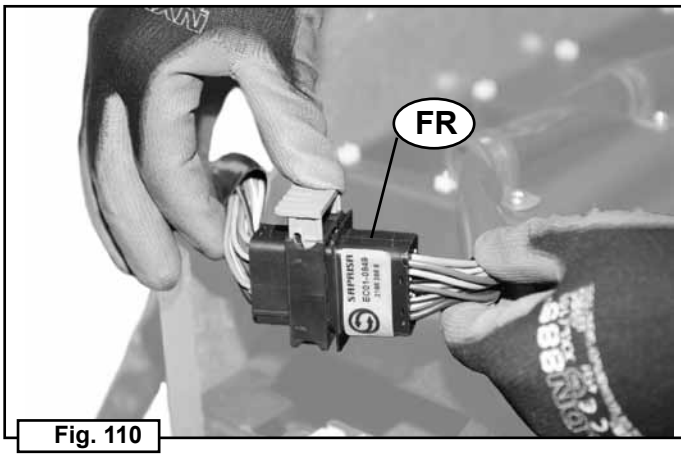


Fig. 110

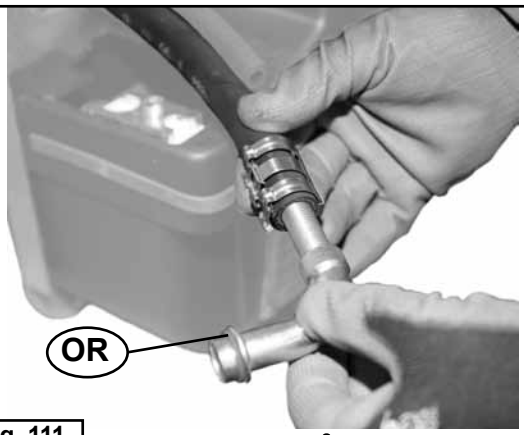


Fig. 111

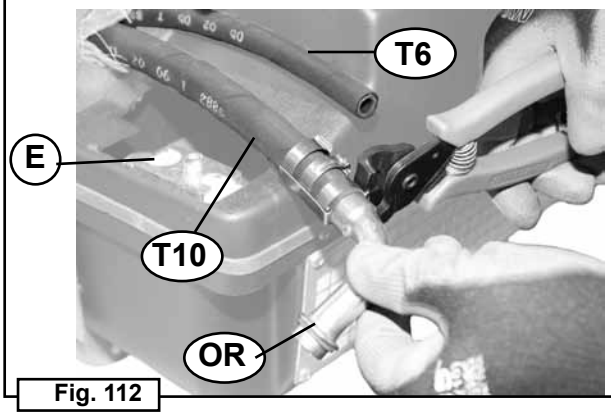


Fig. 112

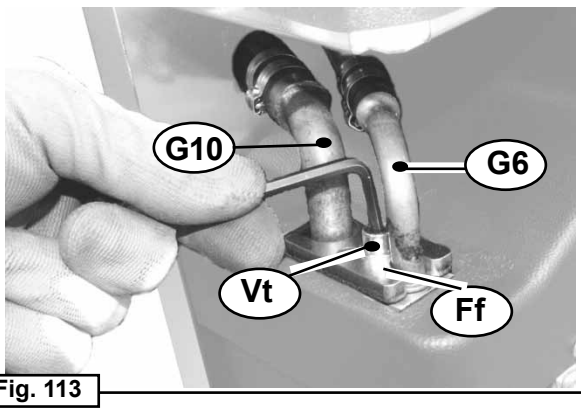


Fig. 113

Step	Description
3	After completing the gas circuit, tape the metal union **G10** 90 using the supplied anti-condensation mastic **MC** (fig. 114) to prevent condensation infiltrating into the cab.

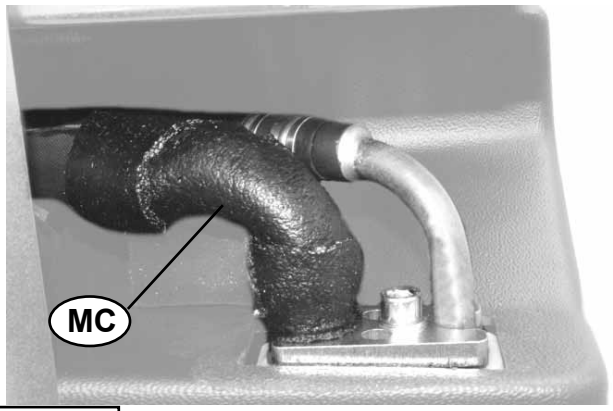


Fig. 114

Step	Description
4	Ended the gas circuit operations, remount the split **S** fig. 115 unit case cover **C** that was previously removed and secure it using the screws that were previously removed fig. 117.

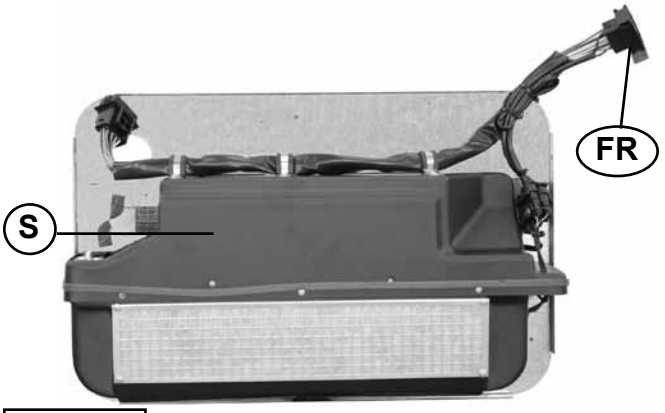


Fig. 115

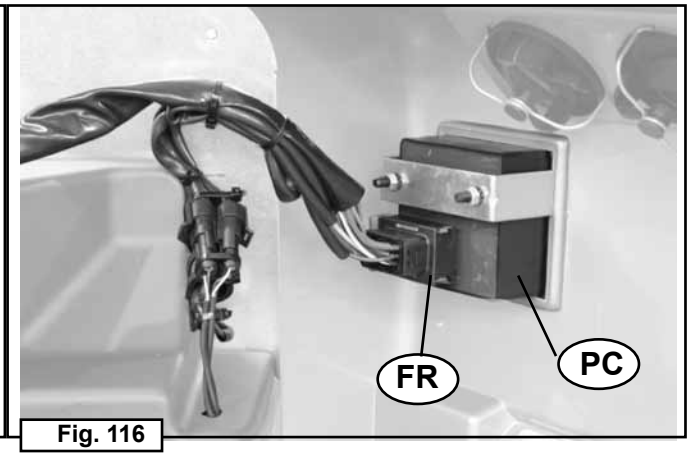


Fig. 116

Step	Description
5	Before remounting the split's protective cover (**c**), make sure that the FRAMATOME **FR** connectors of the control panel (**Pc**) is hooked up. with connector of wiring **W** See fig. 116

Fig. 117

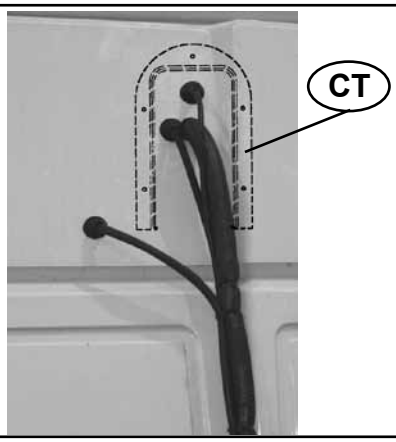


Fig. 118

Step	Description
6	After mounting the system, attach the plastic pipe covering **CT** (supplied) as shown in the figure 118, by boring the cab rear using a 3.5mm bit and attaching with the supplied self-threading screws .

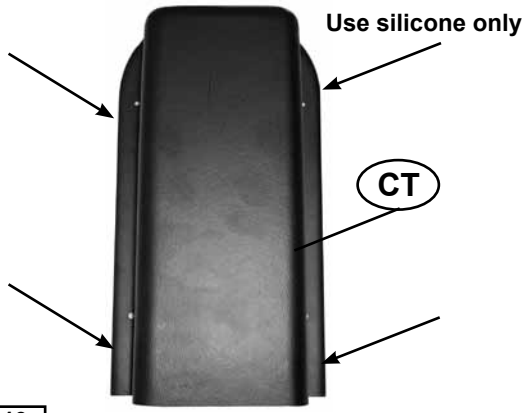


Fig. 119

Step	Description
7	**NB:** It is recommended to use a light thread of silicone not supplied on the contact surface of the covering **CT** to the sheet metal of the cab to optimise the seal see fig 119.

COMPULSORY OPERATIONS!!!

Step	Description
1	After mounting the split unit and the pipes, in order to ensure proper drainage of the condensation in the split unit, it is OBLIGATORY to insert the condensation dissipation terminal into the end of the condensation drainage pipe (fig. 121) and the dissipater **D** into the support **S**, if not already inserted (fig. 120).
2	**Attention!** **Non-observance of this regulation could lead to drainage problems of condensation inside the vehicle cab!** **Lombardini S.r.l declines all responsibility for damage to persons or things caused by non-observance of this regulation.**

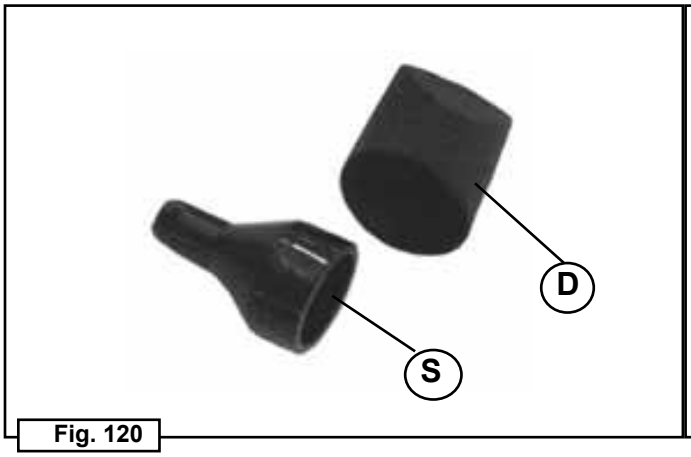


Fig. 120

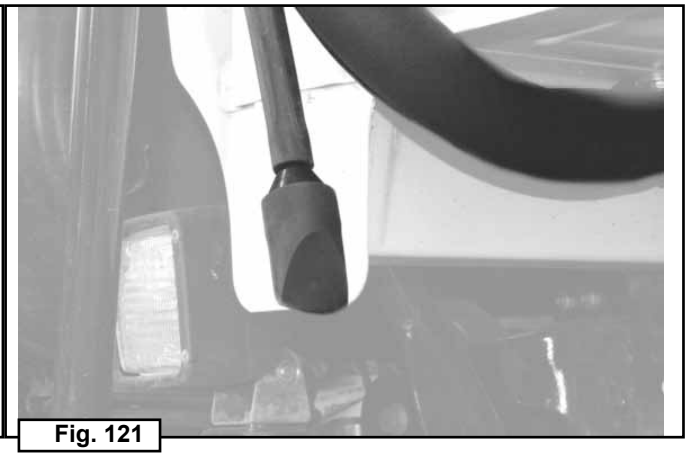


Fig. 121

3.11 FILLING THE GAS CIRCUIT WITH R 134 A

Connect the **PL** and **PH** taps of the gas charger station **AC (not supplied)** to the relevant access points **PS** (fig. 123).

WARNING!

For a correct "system vacuum" operation, a time of at least 30 minutes and a calibrated gas charge in accordance with that reported in the table 1 on page 11 (recommended).

Fig. 122

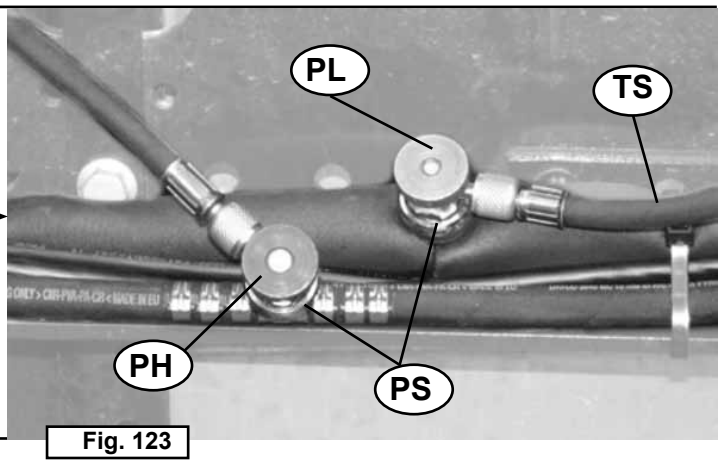


Fig. 123

PS: Access points on the gas circuit

PH + PL: Recovery taps on the charger / recovery station

TS : Service pipes

Frequency of system refilling.

It is recommended to refill the system with R 134 A (TETRAFLUORETHANE) at least once a season, in order to ensure an optimum system performance.

NB: It is extremely important to observe the quantities given on page 10÷11

Safety warnings

ATTENTION

As the system is pressurised, specific operations on the thermodynamic plant must be carried out in full compliance with the regulations for systems containing HFCs and must only be performed by an ECOWIND authorised service centre. Lombardini S.r.l declines all responsibility for accidents and/or damage deriving from non-observance of this regulation.

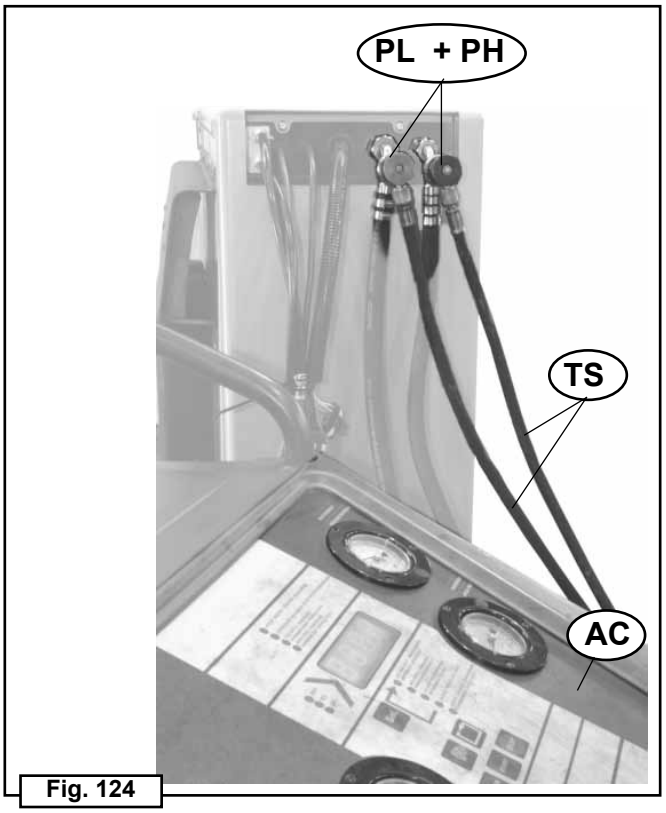


Fig. 124

ATTENTION

PRESSURIZED SYSTEM

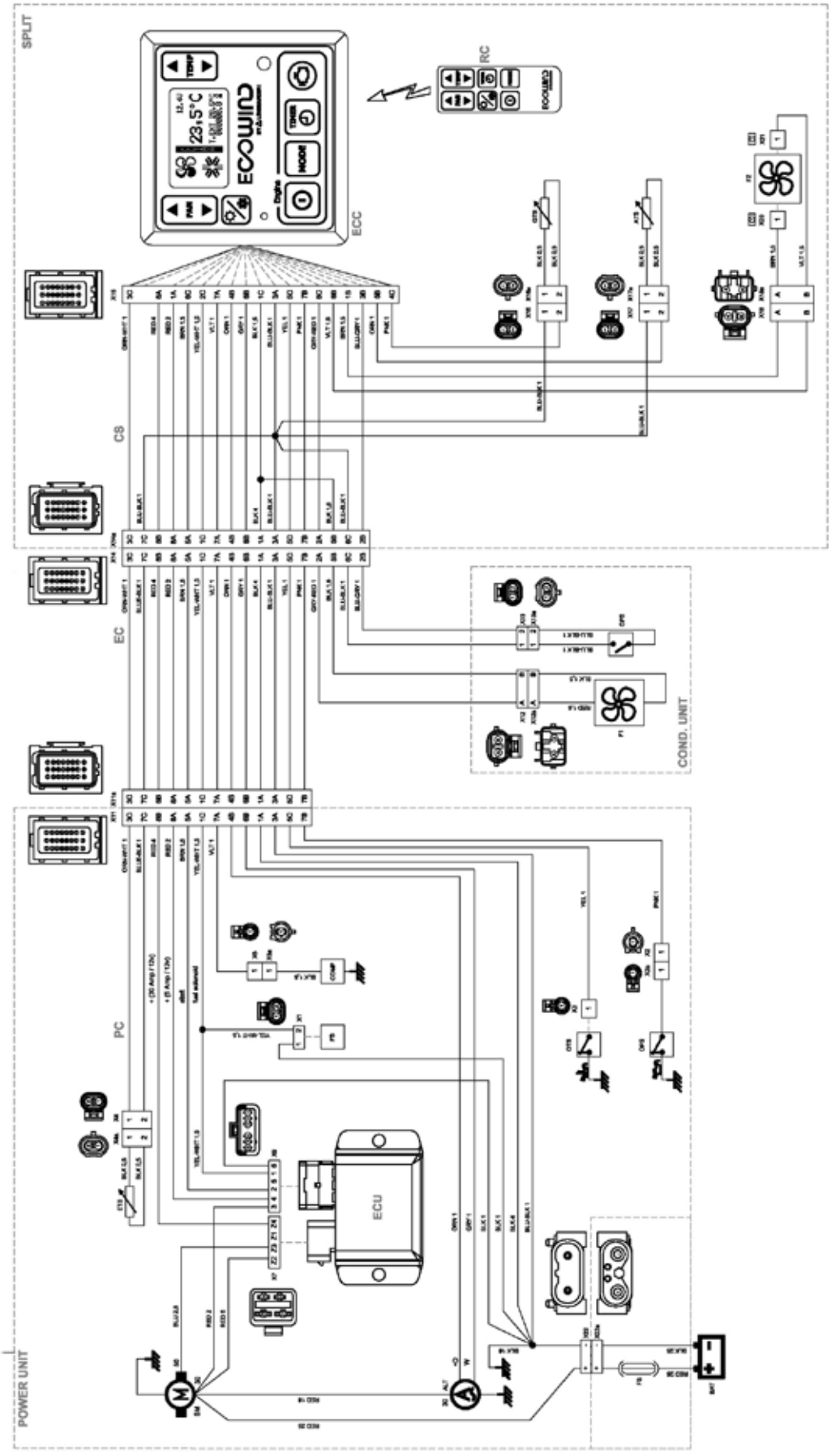
Before performing any maintenance operations on the gas circuit, it is absolutely essential to empty the pressurised system (R 134 A) using the specific charger/recovery station.
Pay the utmost attention, when disconnecting the TS service pipes as they may contain pressurized coolant!!
Avoid direct skin and eye contact with coolant!!

NB: Wear protective goggles and gloves.
The coolant has a boiling temperature (in normal environmental conditions) of about -26 °C (~ -14.8 °F).
Non-observance of this regulation could cause burns and serious harm to the operator!!!

It is strictly forbidden to release and/or dispose of the coolant GAS (R 134a) and the compressor lubricating oil contained in the refrigerating circuit into the environment.

ECOWIND by Lombardini declines all responsibility for damage caused to things, persons, animals or the equipment itself as a result of non-observance of this regulation.

CABLE HARNESS 12 Volt - COD. 7971.126



CABLE HARNESS 12 Volt - COD. 7971.126

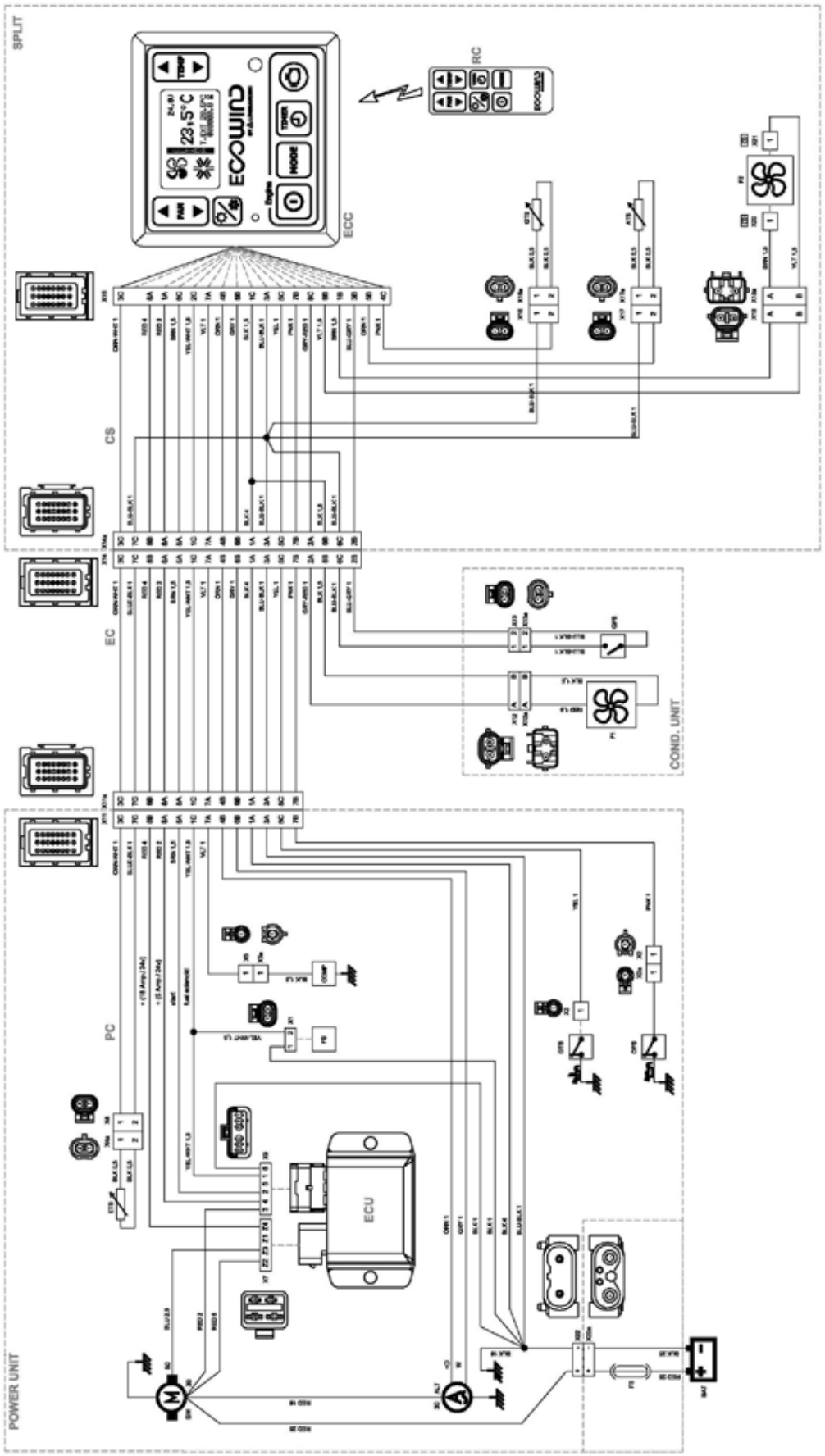
ITEMS

NAME	DESCRIPTION	SAPRISA P.N	LOMBARDINI P.N
ALT	ALTERNATOR		
ATS	AMBIENT TEMP SENSOR		
BAT	BATTERY		
COMP	COMPRESSOR		
EC	EXTENSION CORD	EC02	2186 286 8
ECC	CONTROL PANEL	L801	2193 295 8
ECU	ELECTRONIC CONTROL UNIT	K042	2193 294 8
ETS	EXTERNAL TEMP SENSOR		
F1	COND. UNIT FAN		
F2	SPLIT FAN		
FS	FUSE		
GPS	GAS PRESSURE SWITCH		
GTS	GAS TEMP SENSOR		
OPS	OIL PRESSURE SWITCH		
OTS	OIL TEMPERATURE SWITCH		
PC	POWER CABLE	EC01	2186 288 8
RC	IRDA REMOTE CONTROL	L811	9141 008 8
SC	SPLIT CABLE	EC03	2186 287 8
SM	STARTER MOTOR		

CONNECTORS

LETER	NAME/DESCRIPTION	BRAND	P.N.
X1	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X2	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282079-2
X2a	1 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282103-1
X3	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X4	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X4a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X5	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X5a	1 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282103-1
X7	4 WAYS SEALED CONNECTOR 1620 SERIES	SAPRISA	1624 + 1622
X8	6 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC3680048
X11	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC2496S0005 + 211A247001
X11a	24 WAYS MALE HOUSING SICMA SERIES	FCI	211PC2496003
X12	2 WAYS METRIPACK SERIES 280 FEMALE	DELPHI	15300027
X12a	2 WAYS METRIPACK SERIES 280 MALE	DELPHI	15300002
X13	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X13a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X14	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC2496S0005 + 211A247001
X14a	24 WAYS MALE HOUSING SICMA SERIES	FCI	211PC2496003
X15	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC2496S0005 + 211A247001
X16	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X16a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X17	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X17a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X18	2 WAYS METRIPACK SERIES 280 FEMALE	DELPHI	15300027
X18a	2 WAYS METRIPACK SERIES 280 MALE	DELPHI	15300002
X20	FASTON 6,35 FEMALE ISOLATED	-	-
X21	FASTON 6,35 FEMALE ISOLATED	-	-
X22	PLUG 60A 150V (MALE TERMINAL)	REMA	
X22a	SOCKET 60A 150V (FEMALE TERMINAL)	REMA	

CABLE HARNESS 24 Volt - COD. 7971.127



CABLE HARNESS 24 Volt - COD. 7971.127

ITEMS

NAME	DESCRIPTION	SAPRISA P.N	LOMBARDINI P.N
ALT	ALTERNATOR		
ATS	AMBIENT TEMP SENSOR		
BAT	BATTERY		
COMP	COMPRESSOR		
EC	EXTENSION CORD	EC02	2186 285 8
ECC	CONTROL PANEL	L809	2193 297 8
ECU	ELECTRONIC CONTROL UNIT	K045	2193 296 8
ETS	EXTERNAL TEMP SENSOR		
F1	COND. UNIT FAN		
F2	SPLIT FAN		
F9	FUSE		
GPS	GAS PRESSURE SWITCH		
GTS	GAS TEMP SENSOR		
OPS	OIL PRESSURE SWITCH		
OTS	OIL TEMPERATURE SWITCH		
PC	POWER CABLE	EC01	2186 286 8
RC	IRDA REMOTE CONTROL	L811	0141 006 8
SC	SPLIT CABLE	EC03	2186 287 8
SM	STARTER MOTOR		

CONNECTORS

LETER	NAME/DESCRIPTION	BRAND	P.N.
X1	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X2	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282079-2
X2a	1 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282103-1
X3	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X4	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X4a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X5	1 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X5a	1 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282103-1
X7	4 WAYS SEALED CONNECTOR 1820 SERIES	SAPRISA	1824 + 1822
X9	6 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC0969D049
X11	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC24950005 + 211A2477001
X11a	24 WAYS MALE HOUSING SICMA SERIES	FCI	211PC2469003
X12	2 WAYS METRIPACK SERIES 280 FEMALE	DELPHI	15300027
X12a	2 WAYS METRIPACK SERIES 280 MALE	DELPHI	15300002
X13	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X13a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X14	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC24950005 + 211A2477001
X14a	24 WAYS MALE HOUSING SICMA SERIES	FCI	211PC2469003
X15	24 WAYS FEMALE HOUSING SICMA SERIES	FCI	211PC24950005 + 211A2477001
X16	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X16a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X17	2 WAYS SUPERSEAL 1,5 SERIES HOUSING PLUG	AMP	282080-1
X17a	2 WAYS SUPERSEAL 1,5 SERIES HOUSING TAB	AMP	282104-1
X18	2 WAYS METRIPACK SERIES 280 FEMALE	DELPHI	15300027
X18a	2 WAYS METRIPACK SERIES 280 MALE	DELPHI	15300002
X20	FASTON 6,35 FEMALE ISOLATED	-	-
X21	FASTON 6,35 FEMALE ISOLATED	-	-
X22	PLUG BDA 150V (MALE TERMINAL)	REMA	
X22a	SOCKET 80A 150V (FEMALE TERMINAL)	REMA	

TROUBLESHOOTING ECC (L802) Oct.2010

N°	PROBLEM	MESSAGE	ICON	CAUSE		SOLUTION		NOTE
0	No switch on when pressing ON/OFF button	No message	Not available	0.a	No power supply	0.a.1	Wait few minutes for ECU fuse rearm	
						0.a.2	Revise fuse FS if is neccessary replace it	See diag. 791 126 e/o 127, pag. 58-61
						0.a.3	Revise right connection from BATTERY to FS connector X 22	
						0.a.4	Revise power wiring to connector X 22 at Starter motor "M" - 30	
						0.a.5	Revise right connection from starter motor "M"- 30 to connector X9 pos. 4.	
						0.a.6	Revise right connections to connector X 9 pos. 3 at connector X15 pos. 1A	
						0.a.7	Revise right connection from GROUND to connector X 15 pos. 3A, to BATT -	
						0.a.8	Replace ECU on PWU	
				0.b	Low or damaged battery	0.b.1	Re-charge or replace battery	
				0.c	Damaged ECC	0.c.1	Replace ECC on Split	
1	Engine start failure	Engine start failure icon		1.a	No fuel	1.a.1	Revise fuel level	Check the fuel level in the tank
				1.b	Gagged air vent tank	1.b.1	Clean and free air vent tank	Service book
				1.c	Gagged air filter engine	1.c.1	Replace air filter engine	Service book
				1.d	Gagged fuel filter	1.d.1	Replace fuel filter	Service book
				1.f	Air in the fuel line	1.f.1	make sure that the fuel filter is correctly mounted. If it is right but the problem continues conctat autorised service centre	Service book
				1.g	Fuel pump damaged	1.g.1	Mechanical issues in the pump. Replace the fuel pump	
				1.h	Low or damaged battery	1.h.1	Re-charge battery	
						1.h.2	Replace battery	
				1.i	Wrong connections	1.i.1	Revise right connection to connector X9 pos.5 at connector X15 pos. 6C	See diag. 791 126 or 127, pag. 58-61
						1.i.2	Revise right connection to connector X7 pos. Z3 at Starter motor – 50	
				1.l	Damaged Starter motor	1.l.1	Replace starter motor on PWU	
				1.m	Damaged ECU	1.m.1	Replace ECU on PWU	
				1.n	Damaged ECC	1.n.1	Replace ECC on Split	

2	Engine oil pressure	Engine oil pressure icon		2.a	No engine oil	2.a.1	Revise engine oil level	Service book
						2.a.2	Check if in the engine there are leaks of oil	
				2.b	No engine oil pressure switch detection before starting	2.b.1	Revise right connection to oil pressure switch OPS - connector X2 at connector X15 pos .7B	See diag. 791 126 or 127, pag. 58-61
						2.b.2	Replace oil pressure switch OPS	
				2.c	Damaged ECC	2.c.1	Replace ECC on Split	
3	Engine oil temperature	Engine oil temperature icon		3.a	High engine temperature	3.a.1	Check if the air intake engine on PWU are free.	Service book
						3.a.2	Check if the air outlet to cooling internal PWU are not gagged.	
						3.a.3	Issues engine lubrication	
				3.b	No engine temperature switch detection before starting	3.b.1	Revise right connection to engine temperature switch OTS - X3 at connector X15 pos. 5C	See diag. 791 126 or 127, pag. 58-61
						3.b.2	Replace the engine temperature switch OTS	
				3.c	Damaged ECC	3.c.1	Replace ECC on Split	
4	Alternator failure	Battery icon		4.a	Broken belt trasmission	4.a.1	Replace belt on PWU	
				4.b	Alternator no charge signal detection before starting	4.b.1	Revise right connection to Alternator D+ at connettor X15 pos. 4B	See diag. 791 126 or 127, pag. 58-61
						4.b.2	Replace alternator on PWU	
				4.c	Alternator no charge after starting	4.c.1	Revise right connection from Alternator - 30 to Starter motor – 30	See diag. 791 126 or 127, pag. 58-61
						4.c.2	Replace alternator on PWU	
				4.d	Damaged ECC	4.d.1	Replace ECC on Split	
5	Service	Service icon		5.a	Service working engine hours overpassed	5.a.1	attemd service	
6	Fuel solenoid	Fuel solenoid warning icon		6.a	No fuel solenoid connection	6.a.1	Revise right connection from fuel solenoid valve FLS connector X1 pos. 2 to connector X 15 pos. 2C	See diag. 791 126 or 127, pag. 58-61
						6.a.2	Revise right connection from fuel solenoid valve FLS connector X1 pos. 1 to GROUND	
				6.b	Damaged coil fuel solenoid	6.b.1	Replace the coil of valve FLS	
				6.c	Damaged fuel solenoid	6.c.1	Replace the fuel valve FLS	
				6.d	Damaged ECC	6.d.1	Replace ECC on Split	

7	Gas pressure	Gas pressure warning icon		7.a	No gas in circuit R134a . Minimum level pressure gas less < 2bar	7.a.1	Check eventually gas leaks in the circuit R134a	
						7.a.2	Check eventually broken components in the circuit R134a	
						7.a.3	Refill the circuit of Gas R134a, with indicate quantity	
				7.b	Exceeded the Maximum pressure level of safety circuit > 27 bar	7.b.1	Check the correct quantity of Gas R134a in the circuit	
						7.b.2	Check the fan condenser that works correctly (cycle works)	
						7.b.3	Ceck the fins of gas condenser are clean and the air of coling gas condenser to crossing properly	
						7.b.4	Check that the plastic cover is install correctly to gas condenser and that it do not break or have a missing parts.	
						7.b.5	Check that there are not objects or things that prevent the rotation of the condenser fan	**WARNING!!! Before proceeding to this verification MUST be strictly off the power supply from the system to battery !**
						7.b.6	Replace gas pressure switch GPS	
				7.c	Wrong connections	7.c.1	Revise right connection from connector X12 pos. A to connector X15 pos. 8C	See diag. 791 126 or 127, pag. 58-61
						7.c.2	Revise right connection from connector X12 pos. B to GROUND	
				7.d	Damaged Gas pressure switch R134a	7.d.1	Replace gas pressure switch GPS	
				7.e	No gas pressure switch detection	7.c.1	Revise right connection from GPS connector X13 pos. 2 at connector X 15 pos. 3B	See diag. 791 126 or 127, pag. 58-61
						7.c.2	Revise right connection from GPS connector X13 pos.1 at GROUND	
						7.c.3	Replace gas pressure switch GPS	
				7.d	Damaged ECC	7.d.1	Replace ECC on Split	
				7.e	In HEATING mode, when exceed the maximum pressure > 27 bar	7.e.1	Is the same rules showes above to 7.a.1 at 7.d.1.	

8	Compressor failure	Compressor failure warning icon		8.a	Damaged AC compressor	8.a.1	Replace AC compressor on PWU	
				8.b	Damaged Coil AC compressor	8.b.1	Replace AC compressor on PWU	
				8.c	No compressor AC connection	8.c.1	Revise right connection from COMP AC at connector X15 pos. 7A	See diag. 791 126 or 127, pag. 58-61
				8.d	Damaged ECC	8.d.1	Replace ECC on Split	
9	Split fan failure	Split fan failure warning icon		9.a	Blocked split fan	9.a.1	Check that there are not objects or things that prevent the rotation of the split fan	**WARNING!!! Before proceeding to this verification MUST be strictly off the power supply from the system to battery !**
				9.b	Damaged split fan	9.b.1	Replace split fan F2 on Split	
				9.c	No split fan connection	9.c.1	Revise right connection from connector X20 to connector X15 pos.1B (POSITIVE)	See diag. 791 126 or 127, pag. 58-61
						9.c.2	Revise right connection from connector X21 at connector X15 pos .8B (GROUND)	
				9.d	PVM (electronic speed control) damaged	9.d.1	Replace ECC on Split	
				9.e	Damaged ECC	9.e.1	Replace ECC on Split	

10	Condensation unit fan failure	Condensation unit fan failure warning icon		10.a	Blocked gas condenser fan	10.a.1	Check that there are not objects or things that prevent the rotation of the condenser fan	**WARNING!!! Before proceeding to this verification MUST be strictly off the power supply from the system to battery !**
				10.b	Damaged gas condenser fan	10.b.1	Replace gas condenser fan F1	
				10.c	No gas condensert fan connection	10.c.1	Revise right connection from fan F1 to connector X15 pos. 8C (POSITIVE)	See diag. 791 126 or 127, pag. 58-61
						10.c.2	Revise right connection from fan F1 to GROUND	
				10.d	Damaged ECC	10.d.1	Replace ECC on Split	
11	external temperature sensor	external temperature sensor warning icon		11.a	Damaged external temperature sensor or incorrect read	11.a.1	Check right sensor position and correct install of external temperature sensor ETS	Service book
						11.a.2	Replace the external temperature sensor ETS	
				11.b	No external temperature sensor connection	11.b.1	Revise right connection from sensor ETS to connector X15 pos.3C	See diag. 791 126 or 127, pag. 58-61
						11.b.2	Revise right connection from sensor ETS to GROUND	
				11.c	Damaged ECC	11.c.1	Replace ECC on Split	
12	ambient temperature sensor	ambient temperature sensor warning icon		12.a	Damaged ambient temperature sensor or incorrect read	12.a.1	Check right sensor position and correct install of ambient temperature sensor ATS	Service book
						12.a.2	Replace the ambient temperature sensor ATS	
				12.b	No ambient temperature sensor connection	12.b.1	Revise right connection from sensor ATS to connector X15 pos.4C	See diag. 791 126 or 127, pag. 58-61
						12.b.2	Revise right connection from sensor ATS to GROUND	
				12.c	Damaged ECC	12.c.1	Replace ECC on Split	

13	Gas temperature sensor	Gas temperature sensor warning icon		13.a	Damaged gas temperature sensor or incorrect read	13.a.1	Check right sensor position and correct install of gas temperature sensor GTS	Service book
						13.a.2	Replace the gas temperature sensor GTS	
				13.b	No gas temperature sensor connection	13.b.1	Revise right connection from sensor GTS to connector X15 pos.5B	See diag. 791 126 or 127, pag. 58-61
						13.b.2	Revise right connection from sensor GTS to GROUND	
				13.c	Damaged ECC	13.c.1	Replace ECC on Split	
14	Low battery	Low battery warning icon		14.a	No enough energy battery level for a normaly condition of works	14.a.1	Re-charge battery	
						14.a.2	Replace battery	
15	Time exceed	Time exceed warning icon		15.a	Total time completed of recharging battery on RECHARGE-BATTERY – AUTOMATIC mode	15.a.1	Likely demand / consumption exceeding supply in electrical generator	Turn off some electrical loads. Bring the ECC system in OFF mode to reset all the function.
						15.a.2	Check status battery. If necessary replace the battery	
16	**NOT AVAILABLE**							
17	Internal failure	Internal failure warning icon		17.a	Damaged ECC	17.a.1	Replace ECC on Split	
18	W signal	W signal warning icon		18.a	Broken belt trasmission	18.a.1	Replace belt on PWU	
				18.b	No W signal connection	18.b.1	Revise right connection from Alternator "W" to connector X15 pos.6B	See diag. 791 126 or 127, pag. 58-61
				18.c	Damaged Alternator / regulator	18.c.1	Repalce Alternator ALT in PWU	
				18.d	Damaged ECC	18.d.1	Replace ECC on Split	
19	**NOT AVAILABLE**							
20	No response at remote control commands	No message		23.a	Battery Remote control	23.a.1	Repalce battery	
				23.b	Damaged remote control	23.b.1	Replace remote control	
				23.c	Damaged ECC	23.c.1	Replace ECC on Split	

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